The JOURNAL of INSURANCE

PUBLISHED BY THE AMERICAN RISK AND INSURANCE ASSOCIATION
(Formerly The American Association of University Teachers of Insurance)

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Commission on Insurance Terminology
Book Reviews · Index Volume XXV
N.A.I.I. Journal of Insurance Awards
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SEPTEMBER, 1961
VOLUME XXVIII, No. 3

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The Journal of

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SEPTEMBER, 1961

VOLUME XXVIII, No. 3

Orders for publications and inquiries regarding membership should be addressed to the Secretary of the Association, Southern Methodist University, Dallas, Texas.

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Published by
THE AMERICAN RISK AND INSURANCE ASSOCIATION
(Formerly The American Association of University Teachers of Insurance)
with the financial cooperation of
THE COLLEGE LIFE INSURANCE COMPANY
OF AMERICA

The JOURNAL OF INSURANCE is published four times a year, in March, June, September, and December, by The American Risk and Insurance Association (formerly The American Association of University Teachers of Insurance) and copies are sent to all members of the Association. The subscription price for non-members and libraries is $5.00 a year. Single copies are $1.50. It is printed by the Pantagraph Printing and Stationery Company at 217 West Jefferson Street, Bloomington, Illinois. The office of publication is 210 E. University Ave., Bloomington, Illinois. Second Class Postage paid at Bloomington, Illinois.

THE JOURNAL OF INSURANCE

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EFFECTS OF COVERAGE OF HOME AND OFFICE CALLS IN A PHYSICIAN-SPONSORED HEALTH INSURANCE PLAN

ROBERT J. LAMPMAN and S. F. MIYAMOTO

How comprehensive should benefits be under health insurance? Is it either desirable or feasible that such benefits should cover the cost of physician services out of the hospital? At present only about 7 per cent of the nationwide cost of these services is met by insurance, while 58 per cent of the cost of hospital care and 19 per cent of the total cost of personal health goods and services are paid through insurance.[1] The value of insurance coverage of home and office calls, herein referred to as "extended coverage," is often questioned because such visits occur regularly and are relatively inexpensive. Moreover, it is sometimes argued, the premiums for such coverage are likely to be prohibitive because of incentive to increased use of physician services and the costs of administering small claims. On the other hand, proponents of such coverage point out that the cost of multiple visits can add up to a large amount for a few people, and that insurance against such cost will be economical if it encourages more timely visits and hence early detection of serious conditions. Further, it is argued, such insurance may remove the incentive to use the more expensive types of care which exist when only in-hospital costs are covered.

This paper is directed to the specific questions of (1) how the costs of health care and the utilization of health services are affected by increasing the scope of health insurance benefits to include home and office calls of physicians, and (2) how physicians and subscribers respond to experience with insurance of this scope. It is based upon data collected by the authors in 1957 as part of an intensive study of a particular physician-sponsored nonprofit insurance organization, the King County Medical Service Corporation, of Seattle, Washington.

The Insuring Organization

The organization under study is of

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Professors Lampman and Miyamoto together with George A. Shipman, professor of political science at the University of Washington, are authors of a forthcoming book on *The Administration of Medical Service Corporations in the State of Washington.* The research project from which the book and this paper derive was sponsored by the Health Information Foundation. Support for the extensive computational work behind Tables 6, 7, 8 and the Appendix Tables was provided by the Social Systems Research Institute of the University of Wisconsin. The authors are indebted to Professor Shipman and Dr. Odin Anderson for assistance and advice; to Mr. Jurgen von Rennenkampf for computation; and to Prof. Donald E. Farrar for guidance in statistical analysis.

[1] Health Information Foundation, "The Trend of Health Insurance Benefits," *Progress in Health Services*, Vol. IX, No. 4 (April, 1960).

special interest for several reasons. It offers rather comprehensive services, ranging from home and office calls and in-patient hospital care to limited protection against the costs of prolonged illness. At the same time, the plan does not alter traditional forms of professional practice. Nearly all members of the profession in private practice participate in the plan. The subscriber has free choice of participating physicians; the physician is not obligated to accept any patient; payment is on a fee-for-service basis, with the physician paid by the Corporation. (That is to say, physician charges are covered on a service benefit basis.) Control of cost, utilization, and standards of care are all in the hands of the profession. Scope of services covered and rates paid by subscribers are set by negotiation between administrators of the plan and representatives of subscribing groups. The plan is administered by a "medical service corporation," which may be characterized as a specialized administrative arm of the county medical society.

King County is largely metropolitan, and had a population of approximately 800,000 in 1956. The King County Medical Service Corporation had more than 1,000 participating physicians and 220,000 subscribers at that time.

The plan has a wide variety of contracts, nearly all of which are variations of a basic type. This is a contract with (or for) an employed group, under which the principal subscriber is entitled to home and office calls, the subscriber and his dependents to doctor's services in the hospital and hospital services. Characteristically, some conditions are excluded. Also, various deterrents to utilization are introduced. These may involve obtaining a "request for treatment" from the place of employment, the payment of one or two dollars for such a request for the first call for a condition, and a "first call deductible" for each condition. These several variables may be combined into some modification or elaboration of the basic type of contract in a way that provides the services desired at a cost per month acceptable to the subscribing group. Most contracts provide for physicians' services on a "service" basis and for hospital expanse on an "indemnification" basis.

The Medical Service Corporation has a set of internal controls designed to protect the plan against misuse by participating doctors.[2] If particular physicians submit abnormally high service billings per month, a review by the medical staff may follow. Occasionally a subscriber complaint will lead to an investigation of the circumstances. Some procedures, when employed by a physician who is not a specialist in the field, come under routine review, such as X-rays for internal diagnosis and electrocardiograms. Claims for surgical procedures performed under service contracts must be accompanied by a copy of the dictated record of the procedure made in the hospital. High hospital charges come under routine review by the medical staff. There is always the possibility that the practices of a physician will be referred to the medical advisory board for review. Disciplinary

[2] For an illuminating discussion of the importance of such internal controls see Anne R. and Herman M. Somers, "Health Insurance: Are Cost and Quality Controls Necessary?", *Industrial and Labor Relations Review*, Vol. 13, No. 4 (July, 1960), reprinted as Reprint No. 45, The Brookings Institution.

The authors of a study of the Windsor (Ontario) Medical Services plan found that ". . . abuse of service by subscribers is not an administrative problem of major proportions. It would represent a misdirected and purposeless effort, therefore, for the plan to institute devices aimed solely at controlling abuse by subscribers through deductible or coinsurance provisions. The important administrative problem is related not so much to the control of subscriber overutilization as it is to the control of payments made to physicians on a fee-for-service basis." Benjamin J. Darsky, Nathan Sinai, and Solomon J. Axelrod, *Comprehensive Medical Services Under Voluntary Health Insurance* (Cambridge: Harvard University Press, 1958), pp. 232-233.

action, even exclusion from participation in the plan, can result. Particularly noteworthy is the practice of appealing a case for special review. If the physician is convinced that the fee schedule is inequitable in a given instance, or that duration of coverage will not enable him to complete indicated treatment, an appeal may be taken through the medical staff of the Corporation. The medical advisory board will review the case if the judgment of its members is needed. Formal action is taken by the trustees.

Underlying the treatment of these appeals are two attitudes: the physician should be treated equitably in the unusual and difficult case; the subscriber's treatment should not be impaired merely because uniform contract provisions cannot cover the extraordinary case. Pervading the corporation's approach to these problems is an attitude that the plan is a projection of the physician's role in relation to the patient and to the community. In this there are strong ethical overtones.

Of special concern to this study is the extension of home and office call coverage to dependents, which was done for the hourly workers of the Boeing Company. Thus one large block of covered persons had a most comprehensive type of care. Other groups of workers were covered under contracts that offered this extended coverage to the worker but not to his dependents. Significant comparisons between the Boeing group and those in other employment groups were possible. To provide the basis for such comparisons, two samples of families were drawn from the files of the King County Medical Service Corporation, one for families covered by the Boeing hourly workers contract (361 families; single person families were excluded), and another drawn at random from all non-Boeing groups (383 families, single person families were included). The samples showed these characteristics:

	Boeing	*Non-Boeing*
Families in sample	361	383
Median family size	3.5	2.6
Without single persons	—	3.0
Median family income	$5,735	$5,831
Under extended coverage for dependents	92%	Negligible
Employment	Predominantly manufacturing	Predominantly services, wholesale and retail trade

Interviews of about an hour's duration were conducted with these families by the Public Opinion Laboratory at the University of Washington.

A study of physicians' attitudes was based upon interviews with 360 members of the King County Medical Society; 319 of whom were participants in the plan. An inquiry into administrative operations was carried on by interview with all key officers of the Corporation, by examination of documents and by close observation of the flow of work.

Basic Data on Use and Charges

A broad view of the pattern of utilization of, and charges for, personal health goods and services is afforded by Table 1. The average number of physicians' home and office calls per person per year in the two samples was 4.4. Half of these calls were for "major illness" and half for "minor illness." The number of hospital admissions per 100 persons was 12 and the average stay in the hospital per admission was 5.8 nights. This resulted in a rate of 70 hospital nights per 100 persons. The whole group experienced surgical procedures at the rate of 8 per 100 persons. The total value of personal health goods and services received (exclusive of "cost-free" services) was $95 per person.

The utilization rates and charges for the Washington samples are generally

TABLE 1

SUMMARY DATA ON UTILIZATION OF SERVICES AND CHARGES FOR PERSONAL HEALTH GOODS AND SERVICES

(Two Samples from King County Medical Service Corporation, Seattle)

	Number of Home and Office Calls per Person			*Hospital Utilization*					
	Any Illness	*Major Illness*	*Minor Illness*	*Hospital Admissions Per 100 Persons*	*Hospital Nights Per Admission*	*Hospital Nights Per 100 Persons*	*Surgical Procedures Per 100 Persons*	*Total Charges Per Person*	*Per Cent Paid by Insurance*
Males									
Boeing	4.4	2.3	2.1	10	4.3	41	9	$ 76	51
Non-Boeing	3.9	2.4	1.5	9	6.2	54	6	$ 83	44
Females									
Boeing	4.9	2.6	2.4	18	5.5	99	15	$116	51
Non-Boeing	4.5	3.0	1.5	11	7.2	80	8	$105	44
All Persons									
Boeing	4.6	2.4	2.2	14	5.1	71	12	$ 96	51
Non-Boeing	4.2	2.7	1.5	10	6.8	68	7	$ 94	44
Both Samples	4.4	2.6	1.8	12	5.8	70	9	$ 95	48

somewhat higher than those recorded by a nation-wide survey.[3] Home and office call rates are apparently higher, although there is only limited evidence for such a comparison. However, hospital use is lower and surgical procedure rates are about the same. The per capita total charge is more than a fourth higher in the two samples than for the nation-wide insured group.

In the two Washington samples, over 40 per cent of the total value of health goods and services is accounted for by physicians' services. Hospitals and medicines account for equal shares of about one quarter of the total. The remaining approximately ten per cent is distributed over a wide range of "other" goods and services.

[3] Odin W. Anderson and Jacob J. Feldman, *Family Medical Costs and Voluntary Health Insurance: A Nationwide Survey* (New York: McGraw-Hill, 1956).

Almost half, or 48 per cent of the total charge for personal health goods and services was paid for by insurance, and the remaining 52 per cent was paid for by the families themselves. Chart I gives a graphic presentation of Boeing charges. That 48 per cent was covered by insurance is an indication of a relatively high level of benefits for the group; in Group Health Insurance, Inc. and Health Insurance Plan of Greater New York only 42 and 47 per cent respectively of total health care costs (excluding dental care) were met by the insurance plans.[4] A leading effect of health insurance was to reduce the number of families having to pay large health bills out of family income. Thus, the proportion of Boeing families with total charges of $495 or more was 24 per cent; but only 7 per cent

[4] Health Information Foundation, "Comprehensive Medical Insurance," *Progress in Health Services*, Vol. VIII, No. 6 (June, 1959).

CHART 1

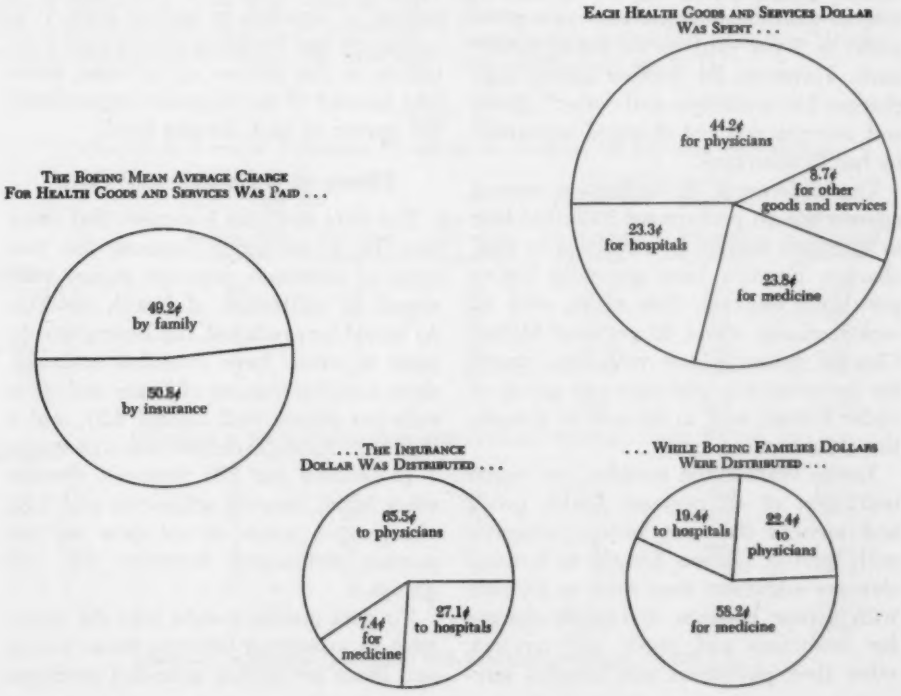
The Boeing Mean Average Charge For Health Goods and Services Was Paid . . .
49.2¢ by family
50.8¢ by insurance
Each Health Goods and Services Dollar Was Spent . . .
44.2¢ for physicians
8.7¢ for other goods and services
23.3¢ for hospitals
23.8¢ for medicine
. . . The Insurance Dollar Was Distributed . . .
65.5¢ to physicians
27.1¢ to hospitals
7.4¢ for medicine
. . . While Boeing Families Dollars Were Distributed . . .
19.4¢ to hospitals
22.4¢ to physicians
58.2¢ for medicine

TABLE 2

PROBABLE EFFECTS OF EXTENDED COVERAGE ON HOME AND OFFICE CALLS

	Calls per Person with		*Age % in Standard Population*	*Total Calls in Standard Population with*		*Difference w/Extended Coverage*
	In-Hospital Coverage	*Extended Coverage*		*In-Hospital Coverage*	*Extended Coverage*	
Males						
Under 6	3.2	3.6	13	42	47	+ 5
6 - 17	2.7	3.9	25	67	97	+30
18 - 34	3.3	3.9	20	66	78	+12
35 - 54	3.2	4.3	30	96	129	+33
55 - w	9.4	6.9	13	122	90	−32
				393	441	+48
Difference in calls with extended coverage: +12%						
Females						
Under 6	4.4	4.2	12	53	50	− 3
6 - 17	1.9	3.5	30	57	105	+48
18 - 34	3.5	3.3	18	63	95	+32
35 - 44	1.6	6.0	16	26	96	+70
45 - 54	4.0	5.8	14	56	81	+25
55 - 64	4.3	6.8	6	26	41	+15
65 - w	17.3	5.3	4	69	21	−48
				350	489	+139
Difference in calls with extended coverage: +39.8%						

of the Boeing families had out-of-pocket charges that high. Similarly, insurance cut the proportion having doctor bills of $195 or more from 32 per cent on a gross basis, to 5 per cent on an out-of-pocket basis. However, the number having high charges for medicines and "other" goods and services was not changed materially by health insurance.

The differences in utilization among age-sex groups perhaps are indicated best in summary fashion by reference to total charges. Females have generally higher per capita use rates than males, with an overall charge about 40 per cent higher. Charges generally rise with age, except for the relatively high-cost age group of under 6 years, and, in the case of women, the child-bearing ages.

In the Washington samples, per capita utilization of all personal health goods and services does not vary significantly with level of income. Length of hospital stay per admission does seem to increase with income, however, and family charges for medicines and goods and services, other than physicians and hospital services, also vary directly with income level. Overall per capita charges and per capita charges paid by the family show no clear pattern of variation by income level. It is suggested that health insurance may contribute to this pattern of the same absolute amount of out-of-pocket expenditure per person at each income level.

Effects on Utilization and Costs

The data in Table 1 suggest that there may be a difference between the two types of insurance coverage groups with regard to utilization of health services. As would be predicted, the Boeing group, most of whom have extended coverage, show a higher number of house and office calls per person (4.6 against 4.2), and a higher surgical procedure rate (12 versus 7 procedures per 100 persons). On the other hand, hospital utilization and total charges per person do not show any important differences between the two groups.

To gain greater insight into the difference in utilization between those having and those not having extended coverage,

it is necessary to depart from the Boeing-non-Boeing breakdown and compare the experience by age-sex groups for those with the two types of coverage. By this method it is possible to estimate the percentage difference in utilization of home and office calls which might accompany a shift in a normal or standard population (that is, one having a standard age-sex composition) from coverage for physicians' care in the hospital, to extended coverage. The data and calculations for such an estimate are shown in Table 2. The table shows, for example, that King County males under six with limited coverage had an average of 3.2 home and office calls per person. In a normal male population 13 per cent are under six. Hence, in a normal population of 100 males with limited physicians' coverage, 42 home and office calls (13 x 3.2) are presumably utilized by those in this age group. Males under six with extended coverage used 3.6 home and office calls per person, for a total of 47 calls, so that five additional calls would be associated with a change of coverage for that age group in a normal population of 100 males.

The additional number of calls for all males would be 48 calls, which is an increase of 12 per cent over the 393 calculated for males with in-hospital physicians' care only. Following the same method for females, including coverage for home and office calls would increase the number of these calls 40 per cent.[5]

Following the same procedure with regard to surgical procedures yields the even more striking finding of increased utilization, namely 22 per cent for males and 100 per cent for females, as indicated in Table 3. On the other hand, the utilization of hospital days of care is found to be markedly lower, 65 per cent for males and 26 per cent for females, by those having extended coverage, as shown in Table 4.

[5] This finding is somewhat lower than that of the Windsor study. ". . . the population enrolled in Windsor Medical Service obtains on the average about 55 per cent more physician services than people without insurance and about 61 per cent more than limited plan subscribers." Darsky, Sinai, Axelrod, *op. cit.*, p. 71.

TABLE 3

PROBABLE EFFECTS OF EXTENDED COVERAGE ON NUMBER OF SURGICAL PROCEDURES

	Surgical Procedures per 100 with			*Total Procedures in Standard Population with*		
	In-Hospital Coverage	*Extended Coverage*	*Age % in Standard Population*	*In-Hospital Coverage*	*Extended Coverage*	*Difference w/Extended Coverage*
Males						
Under 6	15	13	13	195	169	−26
6 – 17	6	13	25	150	325	+175
18 – 34	7	4	20	140	80	−60
35 – 54	7	6	30	210	180	−30
55 – w	3	11	13	39	143	+104
				734	897	+163
Difference in surgical procedures with extended coverage:						+22.2%
Females						
Under 6	0	5	12	0	60	+60
6 – 17	6	14	30	180	420	+240
18 – 34	11	15	18	198	270	+72
35 – 44	4	13	16	64	208	+144
45 – 54	5	16	14	70	224	+154
55 – 64	8	11	6	48	66	+18
65 – w	20	9	4	80	36	−44
				640	1,284	+644
Difference in surgical procedures with extended coverage:						+100.1%

TABLE 4

PROBABLE EFFECTS OF EXTENDED COVERAGE ON TOTAL HOSPITAL DAYS

	Days per Person with			*Total Days in Standard Population with*		
	In-Hospital Coverage	*Extended Coverage*	*Age % in Standard Population*	*In-Hospital Coverage*	*Extended Coverage*	*Difference w/Extended Coverage*
Males						
Under 6	.15	.18	13	2	2	0
6 – 17	.17	.40	25	5	10	+ 5
18 – 34	.00	.16	20	0	3	+ 3
35 – 54	1.50	.42	30	45	13	−32
55 – w	6.80	1.60	13	88	21	−67
				140	49	−91
Difference in hospital days with extended coverage:						−65.0%
Females						
Under 6	.17	.31	12	2	4	+ 2
6 – 17	.06	.25	30	2	8	+ 6
18 – 34	1.02	1.00	18	18	18	0
35 – 44	.34	.93	16	5	15	+10
45 – 54	2.81	.68	14	39	10	−29
55 – 64	1.88	.97	6	11	6	− 5
65 – w	2.80	1.00	4	11	4	− 7
				88	65	−23
Difference in hospital days with extended coverage:						−26.2%

The fact that utilization of physicians' services is higher and of hospital services lower for those having extended coverage, results in the finding that the total value of all health goods and services are about the same for those having the two types of coverage. The calculations, as shown in Table 5, reveal a change of −16 per cent for males and a +16 per cent for females, or an overall change of about zero. It would appear that those on extended coverage tend to consume a slightly different "package" of health goods and services than do those having only in-hospital coverage, using more physicians' services and less of other

TABLE 5

PROBABLE EFFECTS OF EXTENDED COVERAGE ON CHARGES PER PERSON

	Charges per Person with			*Total Charges in Standard Population with*		
	In-Hospital Coverage	*Extended Coverage*	*Age % in Standard Population*	*In-Hospital Coverage*	*Extended Coverage*	*Difference w/Extended Coverage*
Males						
Under 6	$ 55	$ 60	13	$ 715	$ 780	+ 65
6 – 17	40	64	25	1,008	1,600	+ 600
18 – 34	36	68	20	720	1,360	+ 640
35 – 54	96	81	30	2,880	2,430	− 450
55 – w	360	169	13	4,680	2,197	−2,483
				$10,003	$ 8,367	−1,628
Difference in charges with extended coverage:						−16.3%
Females						
Under 6	$ 71	$ 62	12	$ 852	$ 744	− 108
6 – 17	38	58	30	1,140	1,740	+ 600
18 – 34	128	142	18	2,304	2,556	+ 252
35 – 44	54	147	16	864	2,352	+1,488
45 – 54	102	113	14	1,428	1,582	+ 154
55 – 64	147	135	6	882	810	− 72
65 – w	367	158	4	1,468	632	− 836
				$ 8,938	$ 10,416	+1,478
Difference in charges with extended coverage:						+16.6%

goods and services. The plausibility of this finding is enhanced by the understanding that there is less incentive to hospitalization and self-medication and more incentive to home and office care by the physician, when a person's insurance coverage is extended.

Multiple Regression Analysis

The careful reader will note that the analysis set out in the four preceding Tables controls only for age and sex differences in response to the extension of coverage. It will also be noted that there are offsetting differences between the sexes and among the age groups. By use of multiple regression analysis, it is possible to gain further insight into the response of various groups to the extension of coverage. Tables 6 and 7 show the results of such analysis for total charges.[6]

Table 6 presents the independent effects of a number of variables on total charges. For instance, it shows that larger family size, all other variables held constant, is associated with slightly lower per capita charges than is smaller family size. Those personal characteristics which are associated with strikingly larger than average charges, are low income, female sex, old age, and married status. Extended coverage is found to be associated with the relatively small difference of $8. (See column 1 of Table 6.) Here also is found evidence of a positive response to extension of coverage for females and a negative response for males. (See columns 4 and 5.)

Since low income and the married versus non-married characteristics seem to be so important in the determination of total charges, it was decided to analyze the responses to extension of coverage separately by income, sex, and marital status. The results are presented in Table 7. There appears to be a sharp difference in response to extension of coverage by income level. For those in income classes above $3,500 the response is positive, with the strongest response registered by married females. However, for those in income classes below $3,500 the response is strongly negative, and particularly so for males.

Applying the general method of Table 5 to Table 7 yields the estimate that a representative population (in this case assumed to be one divided 50-50 between males and females, with three-fifths of the females married and one-tenth of each sex-marital status group in the below-$3,500 income class) would have charges 5 per cent higher if it were transferred from in-hospital coverage to extended coverage. The result in this case depends heavily upon the per cent of the population assumed to have low-income status. If no low-income cases are assumed, the result is the much higher one of 17 per cent.

What, then, is the best answer to the question: how does extension of coverage affect charges? The answer is: it depends upon what one considers to be the relevant population. This qualified answer is necessary because of differential response by age, sex, and income groups. Most noteworthy in this regard are the negative responses of the older aged groups and the lower income groups. Here one may want to raise a doubt about the plausibility of the data. Is there some non-random factor involved in selecting more sickly persons from the old-age and low-income groups into in-hospital coverage than into extended coverage? Alternatively, can one believe that in the case of old aged or low-income persons there is a more decided tendency to use insured

[6] Appendix Tables 1 and 2 present similar calculations for number of home and office calls and hospital days. The results in these cases are not notably different than those shown in Tables 2 and 4. The weighted results (procedure described below for total charges) are that extension of coverage is associated with a 24 per cent increase in the number of calls and a 32 per cent decrease in the number of hospital days.

TABLE 6

VARIATIONS IN CHARGES PER PERSON ASSOCIATED WITH SELECTED VARIABLES

Personal Characteristics	*All Cases* (1)	*Regression Coefficients* *In-Hospital Coverage Only* (2)	*Extended Coverage Only* (3)	*Male Only* (4)	*Female Only* (5)
	$	$	$	$	$
Larger Family Size As Compared to Single Person	−2.84	−0.76	−3.65	−4.01	−1.73
Income < $3,500 } As Compared to	42.15*	108.51**	24.70	24.56	59.41*
Income > $7,500 } $3,500 - $7,500	2.22	8.72	−2.06	−1.31	2.19
Female As Compared to Male	29.35*	3.07	37.12**	—	—
Differential Age 7 – 17	−9.27	−25.24	−1.61	−4.15	−14.20
18 – 34	2.08	20.50	−1.01	−9.48	13.45
35 – 44 } As Compared to 0–6	−13.49	−21.46	−9.93	3.33	−19.50
45 – 54	−15.30	15.57	−16.68	16.21	−34.37
55 →	41.09*	125.99**	26.31	84.18**	9.92
Unmarried As Compared to Married	−48.02**	−19.46	−53.95**	−6.37	−81.17**
Extended Coverage As Compared to In-Hospital Cov.	8.00	—	—	−0.38	22.64*
A = Constant Coefficient of Regression Equation	102.74	78.13	115.45	84.64	135.68
N = Sample Size	2227	473	1754	1130	1097
R^2 = Coefficient of Determination	.0605	.1430	.0501	.0651	.0729

* Indicates Significantly different from zero at 2σ.

** Significantly different from zero at 3σ.

TABLE 7

VARIATIONS IN CHARGES PER PERSON ASSOCIATED WITH EXTENDED COVERAGE VERSUS IN-HOSPITAL COVERAGE, BY INCOME, SEX AND MARITAL STATUS, WITH FAMILY SIZE AND AGE CONTROLLED

	All Cases	*Male*	*Female Married*	*Female Un-Married*
Persons With Family Income above $3,500				
(Regression Coefficients)	—	$+ 4.93	$+ 35.80	$+ 15.50
Mean	—	75.28	137.36	59.14
N	—	1083	579	442
Persons With Family Income below $3,500				
(Regression Coefficients)	$−108.10*	$−129.09	$− 81.10	$− 59.70
Mean	149.37	131.34	233.15	104.77
N	123	47	33	43

* Indicates significantly different from zero at 2 standard deviations.

services and to avoid non-insured services, a tendency which results in lesser total charges when out-of-hospital services are covered by insurance? There is some evidence to support the former view in the fact that within the low-income group, both the number of doctor calls and nights in hospital are lower for those on extended coverage than for those on only in-hospital coverage. (See Table 8.) The old-aged group shows the same characteristic in Table 2. However, the data are not adequate to resolve these questions, so the final answer must be qualified, as follows.

(1) For the King County population surveyed in this study, the best measure of response to extension of coverage is, as found in column 1 of Table 6, an increase of $8, or about 8 per cent.

(2) For a population, which is representative of all insured populations with respect to sex, marital status, and income class, the response would be smaller, in the range of 5 per cent.

(3) The full range of plausible answers which it is possible to derive from the data here collected is an increase from zero to about 10 per cent.

Attitudinal Responses of Physicians and Subscribers

The preceding section presented evidence on the question of how costs and utilization are affected by extension of benefits. Consideration is given now to the question of how physicians and subscribers respond to experience with insurance coverage of home and office calls.

Physicians' Views on Extension of Coverage

The survey of physicians does not give any direct evidence on the question of how the plan alters utilization and total

TABLE 8

VARIATIONS IN NUMBER OF HOSPITAL NIGHTS AND IN NUMBER OF DOCTOR CALLS ASSOCIATED WITH EXTENDED COVERAGE VERSUS IN-HOSPITAL COVERAGE, BY INCOME, SEX AND MARITAL STATUS WITH FAMILY SIZE AND AGE CONTROLLED

	Male	*Female Married*	*Female Un-Married*
	Regression Coefficients in terms of Nights or Calls		
Persons With Family Incomes above $3,500			
Number of Hospital Nights	− .17	− .37	+ .21
Number of Doctor Calls	+ .46	+2.42**	+ .68
Persons With Family Incomes below $3,500			
Number of Hospital Nights	−5.10*	−1.14	− .17
Number of Doctor Calls	+1.71	−2.77	− .64

* Indicates significantly different from zero at 2 standard deviations.
** Indicates significantly different from zero at 3 standard deviations.

charges, but does tell what the physicians believe to be the facts. A clear majority of the surveyed physicians believe that health insurance in general, and the King County plan in particular, leads to greater utilization of medical and hospital care.

A minority of physicians consider this greater utilization to be "overutilization" or "abuse." However, a majority of them feel that the greater demand encouraged by K.C.M. is "unnecessary." At the same time, a majority of those responding to the question said they thought this greater utilization was "a good thing." This apparent contradiction and ambiguity of attitude seems to arise out of differences in the wording of the two questions. Most doctors feel that this "abuse" or "unnecessary" use is not generalized, but is identified with a hypochondriacal minority. As one physician commented: "This ('overutilization' and 'abuse') is so in the group of patients with marked psychosomatic overlay, and an equally small group that likes to get something for nothing. These minorities weight physicians' impressions and prejudices." The comments do not indicate a clear and overwhelming feeling that strong measures (such as denying benefits except for serious illnesses or conditions) should be taken to limit utilization. It should be reaffirmed that a majority of those responding to the question said that the greater utilization is "a good thing." This raises serious questions about the reasons behind efforts by the K.C.M. to reduce utilization. It may be that the problem lies in the insurance premium charged rather than in anything else. That is, there may be "overuse," in the sense that the original premium was too low to cover cost, which is quite another matter than "overuse" from a medical point of view.

There was widespread agreement that health insurance changes the pattern of care. Those services covered by insurance are more commonly used than they might be without it. Doctors report that patients request hospitalization or laboratory tests with the realization that these services are covered (they even report that patients request specific diagnoses to permit insurance coverage). Doctors also report that they are under pressure to "pad" or "camouflage" their statements to collect from the insuring organization.

In general, physicians do not seem to believe that K.C.M. has had any marked effect upon the quality of medical care. A small minority of 11 per cent says that it has led to a lower quality of care. Only 9 per cent of the participants observe that K.C.M. subscribers get a lower quality of care than other patients. Those who felt that it led to lower quality, tended to emphasize that the "low" fee schedule and restrictive contract provisions discourage high quality care. In some cases the evidence is quite indirect on this point. This comment is indicative. "Many doctors treat Bureau patients as a group apart. We do not. They get the same treatment and consideration as any of our patients." Many who answered that it had raised the quality of care (40 per cent said it had) tied their conclusion to the fact of higher utilization of service. Thus, one physician commented, "At least patients are being seen for conditions which were formerly neglected." Another observed that "While there are some obvious abuses, in general, patient receives more nearly ideal care." Many of those who concluded there was no overall difference, felt the plan had positive and negative effects which tended to balance out. There was a general feeling that the quality of care more basically depends on the individual physician's background and purposes than it does upon the type of financial arrangements established by the plan.[7]

[7] Some light is cast upon this very complex problem of quality of care as related to utiliza-

The practice of extending benefits to cover home and office calls for dependents draws the support of 59 per cent of the participating physicians. There was no clear difference on this question between those who were "pro" and those who were "con" in general attitude toward the plan. (Interestingly, a third of the physicians gave positive reactions to the idea of inclusion of preventive treatments [periodic check-ups, immunizations, and prenatal care] under health insurance.)

Subscribers' Views

There can be no doubt about the popularity among subscribers of the extension of benefits to cover home and office calls. Virtually all of the family members who are eligible for such coverage do, in fact, have it. Moreover, fully three-fourths of those families with a member without extended benefits, report they would cover all members if the coverage were available to them.

On the open-ended question about "things disliked," at least a fourth of the non-Boeing subscribers mentioned that they wanted extended coverage for the whole family. Furthermore, it seems to be highly significant that the group with the lesser per cent of persons having extended coverage (the non-Boeing group) had much the higher level of dissatisfaction with the insurance plan. This dissatisfaction showed up in a long list of complaints and suggestions, the latter including calls for government regulation.

Subscribers were asked whether they thought that having health insurance "affects the doctor's attitude or behavior toward you in any way." The overwhelming number of responses were to the effect that it did not. Those who felt that insurance did have some effect were evenly divided between the responses that insurance led to more and to less consideration from doctors. In response to an open-end question on what subscribers like about health insurance, a good many went out of their way to indicate satisfaction with the quality of the care to which they were entitled under the plan. No more than 2 per cent of those interviewed volunteered complaints or suggestions that could be classified under a heading of "unsatisfactory quality of care." This does not necessarily prove that the plan improves the quality of care. It is clearly indicated, however, that many subscribers believe the plans give them more ready access than they would otherwise have to good quality care.

It seems clear that the general line of subscriber thought was in the direction of more comprehensive benefits. The ulti-

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tion by the findings of a National Opinion Research Corporation unpublished survey of physicians. In answer to one question the physicians indicated what they had experienced as the most important problems they have with their patients. Only 8 per cent of this nationwide sample reported that "seeing the doctor unnecessarily" was one of the most frequent problems. On the other hand, 21 per cent said that "waiting too long before calling the doctor" was one of the most frequent problems. The doctor's concern about unnecessary use of medical service is much greater in the case of women than of men. It is also noteworthy that unnecessary use is not so important a problem as some others, e.g., failure to follow instructions. Overall, these N.O.R.C. findings seem to suggest explanations for the ambivalence in response by K.C.M. physicians to questions surrounding the issue of over and underutilization. They suggest that since physicians report considerable variation of behavior among different classes of patients with respect to this matter, there is bound to be some contradiction in answers to such general questions as were put to them in the present survey. Another question in the N.O.R.C. survey explores what physicians believe to be the more frequent reasons why people put off seeing physicians. The leading reason given is "they are too busy to see a doctor; they don't have time." The second most frequent is "They don't want to spend money on a doctor unless they have to." It is important to observe that physicians realize there are many barriers to utilization other than the charging of a fee. It follows that elimination of collection of a fee for each visit to a physician, via the insurance method, does not destroy all barriers to either necessary or unnecessary utilization and will still leave a situation in which there is some "overutilization" and some "underutilization" from a medical point of view.

mate result of such pressure might be thought of as a comprehensive insurance covering all expenses arising from all health problems. In an effort to determine how widespread and intense the demand might be for such a plan, the subscribers were asked the following series of questions. "Suppose you could get some kind of health insurance that would cover all of the medical expenses you and your family might have in the future—so you wouldn't have to worry about cost. (A) Does such insurance seem like a good idea for your family, or are you just as well off without it? (B) (If your answer to A is yes) How much would you be willing to pay each month to secure such coverage for your family?"

Roughly, 60 per cent of the respondents said they thought that such insurance "seems like a good idea." About 20 per cent said they were "as well off without it." The median amount those interested said they would be willing to pay was about $17 per month. This median suggested amount is equal to about two-thirds of the amount needed to cover the average value of goods and services actually received in that year.

Summary and Conclusions

It seems clear that extending insurance coverage to include home and office calls leads to greater utilization of physician services. The estimate derived from the experience of King County Medical Service Corporation is that such extension produces an increase in the number of home and office calls on the order of 25 per cent. This increase is found to be associated with an offsetting decrease in the use of hospitals of about 35 per cent. Consequently, the total cost of health care is only slightly higher, about 5 per cent, for those who have insurance coverage of home and office calls than it is for those who have in-hospital coverage only.

Most of the physicians in the King County plan believe that insurance leads to greater use of health care, but only a minority of them believe that this leads to a serious problem of "over-utilization" or "abuse"; the majority felt that the increased utilization was "a good thing." Fifty-nine per cent of those interviewed gave explicit approval of the idea of extending benefits to cover home and office calls for dependents.

Subscribers are overwhelmingly enthusiastic about the idea of coverage of home and office calls. This enthusiasm is part of a generalized interest in more comprehensive health insurance coverage.

The general conclusions are that coverage of home and office calls is both desirable and feasible, at least in the form that has been developed under the specific physician-sponsored health insurance organization here studied. It is desirable in the sense that subscribers want such coverage and physicians find it not undesirable in general. It is feasible in the sense that costs are controllable and are not in excess of what subscribers are willing and able to pay.

APPENDIX TABLE 1

VARIATIONS IN NUMBER OF DOCTORS' HOME AND OFFICE CALLS PER PERSON ASSOCIATED WITH SELECTED VARIABLES

Personal Characteristics	*Regression Coefficients (No. of calls)*						
	Income above $3500			*Income under $3500*			
	Males	*Females married*	*Females unmarried*	*All cases*	*Males*	*Females married*	*Females unmarried*
Larger Family Size as Compared to Single Person	−.24	−.37	−.29	1.23	.24	1.67	1.92
Income > $7500, as Compared to $3500 - $7500	.10	−.13	.21	—	—	—	—
Differential Age 7–17	−.44	—	−1.63*	4.68	−1.06	—	−5.78
18–34 as compared	−.31	—	−.84	2.83	−8.10	—	4.05
35–44 to age	−.28	.00	−.34	4.14	−4.62	1.32	11.96
45–54 0–6 (married females	−.23	.03	.15	4.17	−2.25	.81	6.23
55+ as compared to age 18–34)	2.93**	.73	2.00	5.70	−3.08	5.54	5.24
Unmarried as Compared to Married	−.30	—	—	2.96	−3.90	—	—
Extended Coverage as Compared to In Hospital	.46	2.42*	.68	−2.57	1.71	−2.77	−.64
A = Constant Coefficient of Regression Equation	7.34	7.49	5.45	10.83	5.31	16.74	8.56
N = Sample Size	1083	579	442	123	47	33	43
R^2 = Coefficient of Determination	.0336	.0266	.0509	.0357	.1170	33	.1277

* Indicates significantly different from zero at 2 standard deviations.

** Indicates significantly different from zero at 3 standard deviations.

APPENDIX TABLE 2

VARIATIONS IN NUMBER OF HOSPITAL DAYS PER PERSON ASSOCIATED WITH SELECTED VARIABLES

Personal Characteristics	*Regression Coefficients (No. of Hospital Days)*						
	Income above $3500			*Income under $3500*			
	Males	*Females married*	*Females unmarried*	*All cases*	*Males*	*Females married*	*Females unmarried*
Larger Family Size as Compared to Single Person	−.09	.08	.01	.39	.21	.39	.58
Income > $7500, as Compared to $3500–$7500	.02	−.06	.16	—	—	—	—
Differential Age 7–17 as compared to	.16	—	−.05	−.77	−2.07	—	−.17
18–34 age 0–6 (married females	.19	—	−.13	1.25	.84	—	1.48
35–44 as compared to	.54	−.63	.08	.79	.78	.51	1.75
45–54 age 18–34)	.56	.05	−.26	1.42	2.56	−1.15	1.60
55+	1.60**	−.22	.29	3.06	3.41	.58	3.70
Unmarried as Compared to Married	.26	—	—	−.03	−.05	—	—
Extended Coverage as Compared to In Hospital	−.17	−.37	.21	−2.19	−5.10*	−1.14	−.17
A = Constant Coefficient of Regression Equation	2.3238	4.0651	1.0399	3.8274	4.2359	3.6032	3.1904
N = Sample Size	1083	579	442	123	47	33	43
R^2 = Coefficient of Determination	.0326	.0070	.0165	.1141	.1932	.0646	.0848

* Indicates significantly different from zero at 2 standard deviations.

** Indicates significantly different from zero at 3 standard deviations.

BLUE CROSS AND THE COMMUNITY HEALTH PROBLEM

JAMES S. FEIGHT

The community health problem may be defined simply as—"How to finance modern health care for all who need it, not only those who are considered good insurance risks, but those who are not, including the aged, the indigent, and the repetitively ill."

There are two sides to the community health problem—the medical side and the hospital side—and they are about equally divided. Approximately one-half of the national health dollar is spent for hospitalized illness or disability and the other half for medical care outside the hospital.

This article will deal only with the hospital side of the problem because that is all that Blue Cross covers. Blue Shield covers the medical side of the problem. In most states, they are entirely separate corporations, although they cooperate closely in offering companion coverage, Blue Cross for the hospital bill and Blue Shield for the doctor's bill.

Hospital Bills

Some idea of the magnitude of the community health problem may be gained from the fact that hospitals in the United States admit 65,000 patients every day, as many people as there are in the entire population of Chester, Pa., or Terre Haute, Ind. Most of these patients are treated and discharged within a few days, the average stay in a general hospital now is less than eight days (7.6 days in 1959). But within that short time the services the patient receives are so intensive, complicated and expensive that the hospital bill mounts quickly to more than $200. The average hospital bill in Philadelphia is about $250.

In view of the fact that 85 per cent of the wage earners in Pennsylvania earn less than $6,000 a year, and the national average is even lower, it is easy to appreciate that these people are not likely to have $250 lying around loose for an unexpected hospital bill. Their wages are already fully committed to paying the installments on the car, television set, refrigerator, and other modern conveniences which are now considered necessities.

But that $250 bill is only the average. Many bills are in excess of $1,000. During a recent three-month period, Blue Cross in Philadelphia paid 105,000 hospital bills for subscribers. Although the average bill was $250, there were thousands of bills between $300 and $1,000 and there were 1300 bills in excess of $1,000. One thousand three hundred people, during that three-month period, used about $2,000,000 in hospital care. That means that the average bill of these 1300 people was about $1500. Even the relatively well-to-do would have difficulty paying a bill that size from their own resources.

If a $250 hospital bill would be a hard-

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ship for 85 per cent of the people, a $1500 bill would be a catastrophe for them and a distinct hardship for most of the remaining 15 per cent. And this is only the hospital bill, which on the average will be more than doubled when the medical bill (doctor's and surgeon's fee, etc.) is added. To make matters worse, these bills are borne by only 10 per cent of the population because only that proportion of the people go to hospitals each year, and often it is the same people year after year.

To appreciate fully the problem one must recognize a peculiarity about the American hospital system. America is one of the few countries, if not the only one, in which short term hospitals have been built and maintained largely by private instead of government funds. In most countries, hospitals have been built by the government. Even where state medicine does not exist, the hospitals are generally supported and run by the government. In America 95 per cent of the money for the support of general hospitals now comes from paying patients.

In many parts of this country, government contributes very little to the support of these hospitals. In Pennsylvania, the state gives hospitals only up to $10 a day for the free care they render to non-paying patients. This free care cost the hospitals about $24 per day in 1960. In Pennsylvania, none of the counties makes any contribution toward the support of hospitals. The City of Philadelphia contributes no money to the hospitals to help them carry this free-care load. This is not true in some other parts of the country where State, County and City make substantial contributions to hospitals.

Historical Development

Paradoxically, the community health problem has become progressively more acute during the last 30 years, which is the same period during which great medical strides have made it possible for hospitals to save more lives.

There really was no community health problem until the latter part of the 1920's. Before then, although the hospitals did a great deal of charity work by caring for persons who could not or did not pay their bills, they were able to wipe out their deficits through annual fund raising campaigns and contributions from generous benefactors. However, the depression of 1929 and subsequent high taxes have drastically curtailed these sources of income. In 1959, only 5 per cent of hospital income was from donations and philanthropy. Other sources had to be developed if the hospitals were to be able to continue to care for the sick and the only other sources are the patients (either alone or with the help of insurance) and government.

Unless the government were to take over, the most promising solution appeared to be some prepayment plan which would enable the individual to budget regularly for the cost of unexpected illness. The first prepayment plan in the United States, and the one which is generally regarded as the beginning of the Blue Cross concept, was that established at Baylor University Hospital in Dallas, Texas. There Dr. Justin Ford Kimball worked out a plan under which Dallas schoolteachers paid $6.00 a year to the hospital and were assured of receiving hospital care without charge when they needed it. The plan became effective December 20, 1929 with more than 75 per cent of all the eligible teachers in Dallas participating. The Baylor Plan was an immediate success but it was only a one-group one-hospital plan. Only Dallas schoolteachers could enroll and they could go only to Baylor University Hospital.

The idea spread and in 1932 a community-wide prepayment plan was established in Newark, New Jersey, where

most of the hospitals agreed to provide services to members of different subscribing groups. In 1933, a community-wide plan was established in St. Paul, Minn. by E. A. van Steenwyk, who is now the head of the Philadelphia Blue Cross Plan. A year later he designed the Blue Cross symbol and adopted the Blue Cross name to identify this type of plan.

The growth of Blue Cross Plans has been spectacular. In 1933, the Minnesota and Newark Plans together paid member hospitals a total of only $15,000 for hospital care provided to their subscribers. In 1960 the 84 Blue Cross Plans paid member hospitals more than $1,700,000,000 for hospital care. These plans now have combined enrollment of almost 57,000,000 subscribers and have contracts with hospitals having 94 per cent of all of the general hospital beds in the United States.

The expansion of insurance companies in the hospitalization field has also been spectacular. Insurance companies did not become really interested in writing hospitalization insurance until after World War II. Since 1945, hospitalization coverage written by insurance companies has increased from a small portion to more than half of all such coverage written in the United States (50.5 per cent in 1959 with Blue Cross having 44.9 per cent).

Early in its development it became apparent that uniform standards were necessary in order to assure that all Blue Cross Plans would operate similarly and furnish substantially the same services to their subscribers. In 1933, the American Hospital Association issued a series of recommendations known as "Essentials of an Acceptable Plan for Group Hospitalization." These have developed into the Standards of Approval which the American Hospital Association requires must be met before a Blue Cross Plan can become a member of that Association and use the Blue Cross name and symbol. These standards require that at least ⅓ of the members of the board of directors shall be representatives of member hospitals, and ⅓ shall be representatives of the general public; that board members receive no pay for their services as such; that the plan offer service benefits as distinguished from a cash indemnity; that the service benefit contracts provided to subscribers be backed by contracts with member hospitals and that service contracts cover at least 75 per cent of the hospital bill.

Most Blue Cross Plans are incorporated as non-profit corporations under special legislation adopted in most states during the 1930's. The five Plans in Pennsylvania are incorporated under the 1937 amendment to the Nonprofit Corporation Law of 1933 and are subject to the supervision of the Insurance Department under the Nonprofit Hospital Plan Act of 1937. The Blue Cross Plans in Pennsylvania are not subject to the general insurance laws of the State but are supervised under special laws which apply only to them. All subscription agreements, rates charged subscribers, contracts with and payments to member hospitals are subject to the prior approval of the Insurance Department. Blue Cross Plans in Pennsylvania are also subject to triennial, or more frequent, examinations by the Insurance Department.

Because hospitals must depend for 95 per cent of their support on the income received from their patients and because most of these patients could not pay their bills without some form of insurance or prepayment plan, voluntary nonprofit hospitals are vitally interested in the kind of hospital insurance the American people buy.

Standards for Adequate Insurance

What kind of insurance will best meet the needs of the patient and of the hospital? The first requirement is that the

insurance will meet all, or substantially all, of the hospital bills of the insured. A policy which pays only $5 or $12 or even $15 a day does the insured little good and may do the hospital much harm, when the hospital bill for the first day might be $100 and in 10 days $500. The first days of hospitalization are always the most costly because it is then that the expensive tests are made and operations performed, if required. If the insured is without sufficient resources, the hospital will not be paid because the hospital will furnish the necessary services whether or not the patient can pay for them. That is why hospitals prefer a service type insurance contract, such as Blue Cross issues, under which the patient is assured of receiving all necessary hospital services and the hospital is assured of being paid adequately for furnishing these services. This is not to say that contracts which pay cash benefits do not serve a useful purpose. They do, in giving the insured needed cash to replace lost income and helping to pay these and other expenses incurred during illness.

The next requirement for adequate health insurance is that the entire community be given an opportunity to be enrolled—not just the employees of companies with stable employment and high wages or those employees whose hospital experience may be expected to be low because of the age and sex composition of the group. Hospitals do not have to worry about those who generally pay their bills or those who seldom need hospital care. Their problem is to obtain payment from those who need a lot of care and who cannot afford to pay for it.

Originally Blue Cross accepted only group subscribers, but for many years now it has accepted subscribers who are not members of a group and who enroll on a "bill direct" basis. It does this in order to make its coverage available to as large a segment of the community as is possible. In order to protect itself against adverse selection by non-group subscribers, it permits them to enroll only at certain intervals, during a limited period and only after signing a health statement, although a physical examination is not required.

The third requirement is similar to the second, that people who have left their jobs or retired be allowed to continue coverage. These people represent a serious hospital problem because some of them not only need more frequent and extensive care but also because many of them have little money to pay hospital bills. The usual hospital or insurance group policy discontinues coverage when an insured leaves his job or retires. Blue Cross makes it possible for everyone, when he leaves his job or retires, to continue his coverage on a non-group basis, regardless of age and regardless of his health record.

In 1960, there were 3,500,000 persons in the United States over 65 who belonged to Blue Cross, representing about 60 per cent of those in this age group who hold some sort of health insurance coverage. This part of its business has not been economically profitable for Blue Cross. For instance, in 1960 Philadelphia Blue Cross received $3,800,000 from subscribers over 65 years old but it paid out $11,000,000 for their hospital care, showing that the Blue Cross plans recognize this aspect of the community health problem and are doing something about it.

The fourth requirement is that the insurance plan be non-profit, like the hospitals themselves, so that the largest possible portion of the premium dollar will be available to pay for hospital services. The administration expenses of the Blue Cross Plans in the United States during 1959 averaged only 5.5 per cent and an additional 1.23 per cent went into reserves. This means that out of every dollar collected from subscribers, 93.27 cents

went directly to hospitals for patient care as compared with an average of 77 cents from commercial carriers. Since Blue Cross is non-profit, it does not have to take an additional slice out of the premium dollar for dividends to stockholders or commissions to agents.

Rates

To provide service benefits and to compensate the hospitals adequately means that Blue Cross must pay hospitals on a basis which is related to their cost of furnishing services. As hospital costs continue to rise, Blue Cross payments to the hospitals must be increased and, in turn, the rates charged subscribers must be raised. This, of course, is exactly what has been happening with unusual, and annoying frequency in recent years. The trend can be summed up in the following figures:

In 1938, when Blue Cross was established in Philadelphia, hospital costs for all patients averaged about $4.61 a day. Twenty-two years later, in 1960, they were approximately $26.00, an increase of over 450 per cent.

Blue Cross group rates in 1938 for the Standard Contract were 75¢ a month for an individual subscriber and $2.00 for a family. In 1960, the individual rate was $2.80 and the family rate $8.40. In this case the increase was about 300 per cent.

During the same period, average length of stay dropped but this was offset by increased utilization, due principally to the many new kinds of treatment which were not available in 1938.

Of course, an insurance policy which pays a fixed cash benefit of, say, $12 a day can continue to be offered without any increase in premium (if utilization remains the same) because even if the premium dollar taken in is diluted through inflation, so is the indemnity dollar paid out. But a fixed cost benefit contract covers a smaller and smaller portion of the hospital bill as hospital costs increase so that, although the premium may not be increased, the insurance coverage is decreased.

The question is often asked as to whether Blue Cross is pricing itself out of the market. The answer must be "no" unless it is conceded that hospital care is too expensive for the American People to afford. This seems absurd when one considers that last year Americans spent 6 billion dollars for tobacco and 10 billion dollars for liquor but only 5 billion dollars for hospital care. It seems slightly ridiculous to say that we can afford to pay only ½ as much for modern hospital care as we pay for liquor and tobacco.

Perhaps a less controversial comparison would be between the cost of health care and the cost of an automobile. The cost of maintaining one car (of the low price category) is at least $1,000 a year. This allows only $600 for depreciation if the car is paid for, or for installment payments; $200 for gas and oil; $100 for insurance and $100 for repairs, inspections and incidentals.

The complete cost of health care in this country in 1959 was $105 per person. This includes the cost of all hospital care, physicians, dentists, drugs, appliances, glasses, etc. The cost for a family of four was only about $420, less than ½ of the cost of maintaining the family car.

In our society a car is considered to be a necessity and one is willing to pay for it. Is it to be assumed that this same society will honestly say that it cannot afford medical care which is so much more important and costs so much less?

Abuses

Any discussion of hospitals and Blue Cross would be incomplete without some reference to the subject of overutilization or, more bluntly, abuse. Many people firmly believe that abuse of Blue Cross benefits by doctors, patients and hospitals

is the sole cause of the financial difficulties of Blue Cross and the only reason why it has been necessary to raise rates.

There is undoubtedly some abuse but, as Mark Twain said about the rumor of his death, it is greatly exaggerated. Recently the Blue Cross Plan of Northeast Ohio made a survey in Cleveland of 63,000 cases, using 500,000 hospital days. This survey disclosed that:

Fifty per cent of the cases were surgical cases where operations were actually performed. It is unlikely that many people would subject themselves to surgery they did not need, just to collect Blue Cross benefits.

Sixteen per cent of these cases were maternity cases. It is doubtful if many people have babies simply to get Blue Cross benefits.

Thirty-one and one-half per cent were medical cases, that is non-surgical, non-maternity cases, requiring four or more days of hospitalization, where the medical records contained a diagnosis of a condition which required hospital treatment.

Thus, out of the original 500,000 days of care, only 2.5 per cent were rendered in medical cases to people who stayed one, two or three days. If Blue Cross had not paid any of these cases the total saving would have been 2½ per cent. But it is extremely unlikely that even a majority, much less all, of these short stay cases did not require hospitalization.

No reliable way has been discovered to determine the exact extent of abuse. Several surveys have shown that insured persons go to the hospital more frequently than uninsured persons, but paradoxically, they stay for a shorter period.[1] However, the mere fact that insured persons are admitted to hospitals more frequently than uninsured persons does not necessarily prove that those who have insurance are abusing or over-using the hospital facilities. It might just as well mean that those without insurance are under-using these facilities.

A fair estimate might be that not more than 1 per cent of hospitalized cases could be classified in the category of abuse. Even if the extent of abuse is no more than that, the Blue Cross Plans are concerned about it and are taking steps to reduce it even further.

Efforts to Reduce Abuses

The Philadelphia Plan has taken these steps to reduce abuse in the two areas where it is probably most prevalent:

One relates to those subscribers who are being admitted to hospitals as bed patients solely for diagnostic services, even though Blue Cross contracts expressly exclude this benefit. The Plan has recently established a Physicians' Review Board which examines cases which the Plan's staff has previously picked out from the hospital records as being possible diagnostic admissions. It has also established an Administrators' Review Board which will study means of reducing utilization and costs. In addition, the new Co-Pay and Comprehensive Contracts provide for diagnostic services either in the out-patient department of the hospital or in the doctor's office, so that if diagnostic studies are needed the subscriber can obtain them without being admitted to the hospital as an in-patient.

The other concerns those subscribers who are remaining in the hospital longer than is medically necessary. Many of these over-stays occur in the case of older subscribers who have no one to take care of them at home. Accordingly, the new subscription agreements provide for home nursing care by visiting nurses, for subscribers over 65 years of age, following in-patient hospitalization, at the

[1] See O. D. Dickerson, "The Problem of Over-utilization in Health Insurance", *The Journal of Insurance*, Vol. XXVI, No. 1 (Spring 1959), p. 65.

rate of two visits for each unused day of hospital care. In this area, the work of the Physicians' Review Board is effective to ferret out and disapprove unnecessary days of hospitalization. In addition, a program of tentative approval is being developed under which Blue Cross will approve initially only a limited number of days rather than the full number of benefit days to which the subscriber is then entitled. Further days would not be approved unless the attending physician certifies that additional hospitalization is required.

Subrogation

Although not related to abuse, another way in which Blue Cross Plans are trying to save money is through subrogation. At common law, there is no equitable subrogation right for personal injuries or death. Accordingly, the courts have uniformly held that there is no automatic right of subrogation under a health policy as there is under a property insurance policy.

This question was decided specifically and adversely for Blue Cross by the Supreme Court of Michigan in 1954. In the case of *Michigan Hospital Service v. Sharpe* 339 Michigan 357; 63 N.W.(2) 638, it was held, with two Judges dissenting, that, in the absence of a specific subrogation clause in the Subscription Agreement, Blue Cross was not entitled to be subrogated to the subscriber's claim against the third party responsible for his injuries.

However, at the very next term of Court, in June 1954, the Michigan Supreme Court, in the case of *Michigan Medical Service vs. Sharpe* 339 Michigan 574; 64 N.W.(2) 713, held that Blue Shield was entitled to subrogation where the Subscription Agreement contained a specific subrogation clause. Both of these cases are annotated in 43 A.L.R. (2nd) 1167.

As a result of these decisions, many Blue Cross Plans have inserted subrogation clauses in their new subscription agreements. Such a clause is now included in all the new Philadelphia Blue Cross agreements which were approved by the Insurance Department early in 1958.

Conclusions

Blue Cross must continue and intensify its efforts to reduce abuse and in other ways to keep the cost of coverage within the means of as many people as possible. By the end of 1959, more than 70 per cent of the population was covered by some type of hospital insurance. Blue Cross, with almost 45 per cent of this coverage, and the insurance industry, with over 50 per cent, have made a significant start in the solution of the community health problem.

But much remains to be done. Although 70 per cent of the people have hospital insurance, that insurance covered only 58 per cent of the hospital bill in 1959. This is a great improvement over the 27 per cent of the bill which was covered in 1948, but it is still not good enough. The coverage is even less adequate when the total medical bill is considered. Insurance met only 25 per cent of the nation's private medical bill in 1959.

Blue Cross, Blue Shield and the insurance industry must do two things if they do not want the Government to take over the solution of the community health problem:

1. Adequate hospital and medical insurance must be made available to all of the presently uninsured 30 per cent who need it.

2. The insurance coverage must be expanded to cover a substantial part of the presently uncovered 75 per cent of the private medical bill.

These are formidable tasks, but the great strides the "Blues" and the insurance companies have already made in this field give hope that they will be accomplished.

THE DEVELOPMENT OF VOLUNTARY HEALTH INSURANCE IN THE UNITED STATES[1]

LEON APPLEBAUM

Within the last 30 years, but especially within the last two decades, a remarkably rapid growth of voluntary health insurance has occurred in the United States. This phenomenal development is indicated in Table 1 which shows the growth that has taken place since 1940.[2]

To some it may appear that the American people suddenly have become "security" conscious. Attempts to provide protection against the hazards of illness are not new. Although techniques for the provision of medical care have changed, the desire for "security" is as old as prehistoric man seeking shelter to protect himself against the exigencies of his environment. In the United States, major reliance has been placed upon the private sector of the economy to provide protection against the costs of medical, hospital and surgical care through voluntary health insurance. In no other nation in the world has voluntary health insurance been developed to the extent it has in the United States.

The purpose of this paper is to analyze the unique circumstances and events that have led the American people to turn to voluntary health insurance rather than some form of compulsory insurance provided by government. An historical approach to the subject allows an analysis of the development of voluntary health insurance in the United States.

Experimentation with Voluntary Institutions

It is generally agreed that some of the earliest efforts in this country to provide

TABLE 1

NUMBER OF PERSONS WITH HEALTH INSURANCE PROTECTION IN THE UNITED STATES, BY TYPE OF COVERAGE*, 1940-1958

(000 omitted)

	Type of Coverage**		
End of Year	*Hospital Expense*	*Surgical Expense*	*Regular Medical Expense*
1940	12,312	5,350	3,000
1941	16,349	6,775	3,100
1942	19,695	8,140	3,200
1943	24,160	10,069	3,411
1944	29,232	11,713	3,840
1945	32,068	12,890	4,713
1946	42,112	18,609	6,421
1947	52,584	26,247	8,898
1948	60,995	34,060	12,895
1949	66,044	41,143	16,862
1950	76,639	54,156	21,589
1951	85,348	64,892	27,723
1952	90,965	72,469	35,670
1953	97,303	80,982	42,684
1954	101,493	85,890	47,248
1955	107,662	91,927	55,506
1956	115,949	101,325	64,891
1957	121,432	108,931	71,813
1958	123,038	111,435	75,395
1959	127,896	116,944	82,615
1960(est.)	132,000	120,000	86,000

* Net total of people protected—eliminates duplication among persons protected by more than one kind of insuring organization or more than one insurance company policy providing the same type of coverage.

** Includes coverage by insurance companies, Blue Cross, Blue Shield, Medical Society-approved plans and Independent Plans.

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[1] The author is grateful to Professor Robert J. Lampman for his very useful comments and suggestions.

[2] Source: Health Insurance Institute, Source Book of Health Insurance Data, 1959, p. 11; *Health Insurance News*, Dec. 1960. (1959-60 data)

protection against the risks of sickness were made by workers themselves in the late 18th and early 19th centuries. These early attempts took the form of mutual aid societies which paid cash benefits to the family for burial expenses and for general aid on the death of the breadwinner.[3]

Some of these benevolent associations later became insurance companies. Others gradually assumed functions like collective bargaining for wages and hours and became in effect labor unions. Due to a lack of knowledge of actuarial principles, these early groups frequently found themselves in financial stress and often were forced into bankruptcy. Needless to say, labor organizations have always felt that health and welfare benefits are a recognized part of union programs.[4] The lack of medical care for persons in such hazardous and isolated industries as lumbering, mining and railroading led to the development of prepayment services for medical care.

In a few industrial establishments, the employer assumed full financial responsibility for the provision of medical care for his employees and in some instances for their dependents. More frequently the employees contributed to the cost. Sometimes certain facilities were provided by the employer, such as hospitals. On other occasions hospitals developed as proprietary establishments of physicians, most of whom would never have entered the area, much less established a hospital, without a contract with the industry or an association of employees, through which they were assured patients and payments.[5]

[3] Margaret C. Klem, *Prepayment Medical Care Organizations* (3rd ed.; Bureau of Research and Statistics, Federal Security Agency, June 1945), p. 1.

[4] Margaret C. Klem and Margaret McKiever, *Management and Union Health and Medical Programs* (U.S. Department of Health, Education and Welfare, Public Health Service Publication 329, June 1953), p. 5.

[5] Michael M. Davis, *America Organizes Medicine* (New York, Harper & Brothers, 1941), pp. 147-148.

It should be made clear that employers seldom made significant financial contributions to these early plans. Furthermore, employer contributions, where they were made, were looked upon with distrust and suspicion by employees who suspected the intentions of management. In this respect one writer states:

> Provision for health-benefit programs as a part of the contractual relationship between employers and unions was almost unknown a few years ago. Although a number of companies had provided within plant medical services to their employees for many years and a few had established group health insurance programs, these were administered by the employer and were subject to alteration or discontinuance at his will. Many were started as a part of a general welfare program designed to win employee loyalty and discourage union organization. Organized labor, having no voice in their administration and suspecting the motives for which they were established, has never wholeheartedly endorsed company benefit plans.[6]

The enactment of Workmen's Compensation laws has had a decided influence on in-plant health programs and prepaid medical care plans. The state of Washington was among the early states which passed these laws. This Washington law provided that the employer should compensate the worker for loss of earnings but did not provide for compulsory medical care. The Medical Act, passed in that state in 1917, required equal contributions from employer and employee to defray the costs of medical care for industrial accidents and injuries. As a direct result of this legislation, many employees increased their share of contributions to finance medical services for all injuries and illnesses, regardless of origin.

Paralleling the early enactment of

[6] *Health Benefit Programs Established Through Collective Bargaining* (Bureau of Labor Statistics, U.S. Department of Labor, Bulletin No. 841, 1945), p. 1; also Bernhard J. Stern, *Medicine in Industry*, (New York, The Commonwealth Fund, 1946), p. 139.

workmen's compensation laws in the various states, there was also an impressive movement toward compulsory health insurance for the general public. Bills were introduced in a number of state legislatures but none was adopted.[7] Though the movement was active, legislation was never introduced on the national level during this stage of activity, which began about 1915 and lasted throughout World War I. By the end of 1918, the movement for compulsory health insurance had reached a peak and was rapidly subsiding, due, mainly, to strong opposition from the insurance industry, which opposed the movement because of the proposed sickness benefits. Fraternal orders also opposed because they felt that their significance would be undermined.

Opposition was also expressed by producers and sellers of drugs and patent medicines and by Christian Scientists. Though many individual employers were favorably disposed towards the movement, strong employer associations were opposed because of the added taxation involved and the unfavorable effect that resulting increased costs might have upon their business in other states.

It is interesting to note that the American Medical Association, the recognized spokesman for the medical profession, took no official position in this early controversy over compulsory health insurance.

Organized labor, led by its spokesman, Samuel Gompers, and the Executive Council of the American Federation of Labor, opposed compulsory health insurance legislation. The official goal of the American labor movement during this period was to gain benefits through collective bargaining. Gompers feared the federal government because he felt that what Congress gave to the labor movement could be taken from it by the courts. Only through collective bargaining was it felt that organized labor could better itself.

In describing this period in the history of health insurance, one writer concludes that:

> The decade 1910-1920 represents the first clearly delineated period in the history of health insurance in the United States. It was a period where agitation emerged, reached a certain stage of development and then subsided. No legislation was enacted. The movement seemed to vanish altogether and the evidence seems to indicate that it was premature.[8]

The short lived depression of the early Twenties adversely affected a number of union plans that had attempted to provide death, sickness, and permanent disability benefits financed out of membership dues. In most instances these plans had not been established on sound actuarial principles.

During this same period, commercial health insurance companies attempted to insure hospital and medical service contingencies. As a result of the heavy losses experienced, these companies had difficulty in providing insurance against these risks. It was felt that the need for hospital and medical services could not be predicted accurately enough so that there would be a continuing balance between claims and premiums, with sufficient funds left over for profits and reserves. Thus, commercial insurance companies withdrew from this field and did not return until the late Thirties.

[7] Sinai, Anderson and Dollar, *Health Insurance in the United States* (School of Public Health, University of Michigan, 1946), pp. 9-10. For a very complete coverage of this period see Odin W. Anderson, *The Health Insurance Movement in the United States; A Case Study of the Role of Conflict in the Development and Solution of a Social Problem* (doctoral dissertation, University of Michigan, 1948), pp. 42 ff.

[8] Odin W. Anderson, *The Health Insurance Movement in the United States, A Case Study of the Role of Conflict in the Development and Solution of a Social Problem* (doctoral dissertation, University of Michigan, 1948), p. 42 ff.

Forces Bringing Customers into Plans

As a result of a meeting of leaders in the fields of medicine, public health, and the social sciences, the Committee on the Costs of Medical Care was created in April, 1926. With the aid of contributions from various philanthropic organizations, a paid technical staff issued 26 reports during the years 1928-1932. Although all of the reports made important contributions, it was the final report, issued in 1932 during the most severe suffering of the depression, that created the greatest impact on the general public.

In arguing for some form of medical care prepayment insurance, the Committee stated:

> No one fact is more clearly demonstrated by the Committee's studies than this point: that the cost of medical care in any one year falls very unevenly upon different families in the same income or population group. The heart of the problem, therefore, is the equalizing of the financial impact of sickness. . . . On the present fee-for-service basis, it is impossible for 99 per cent of the families to set aside any reasonable sum of money with the positive assurance that that sum will purchase all needed medical care.[9]

The Committee advocated the practice of group medicine organized around a hospital. It further recommended that the cost of medical care be placed on a group payment basis, through the use of insurance, through the use of taxation, or by a combination of both. The Committee was careful to state that this recommendation did not preclude the provision of medical services on an individual fee-for-service basis.[10]

A definite stand was taken by the Committee against the participation of private insurance companies in the forms of insurance that it recommended. The Committee felt that private insurance would tend to increase the costs and not improve the quality of service.

Although the report emphasized the establishment of an adequate system of medical care on a voluntary basis, it was evident to anyone who read it that unless some action on a voluntary basis was brought forward, governmental action would be called for.

Just a few months after the final report of the Committee on the Costs of Medical Care was made public, the first prepaid group hospitalization plan, later known as Blue Cross, went into operation. Prior to the formation of group hospital plans in the United States, individual hospitals had developed group hospitalization policies.

The single-hospital which in effect was the real father of the hospital service plan movement, was the Baylor University plan. Desirous of protection against hospital costs, the white teachers of Dallas, Texas, in 1929 approached the Baylor University Hospital to see if a plan could be developed which would afford such coverage.[11] The hospital worked out a plan under which each teacher would be eligible for hospitalization up to three weeks in return for a payment of three dollars a semester, or six dollars a year. Over 1,500 school teachers joined the plan, which was so successful that, before long, other employed groups in the city requested similar privileges. Soon the plan's membership had increased to several thousand. The success of the Baylor University plan stimulated the development of other plans in Dallas and the southwest.[12]

[9] Committee on the Costs of Medical Care, Final Report, *Medical Care for the American People* (University of Chicago Press, 1932), pp. 12 ff. It should be pointed out that the report issued by the Committee was by no means unanimous. A minority report, taking issue with some of the recommendations of the majority, was made public at the same time as the majority report.

[10] *Ibid.*, pp. 109 ff.

[11] Oscar N. Serbein, *Paying for Medical Care in the United States* (Columbia University Press, 1953), p. 117.

[12] For one of the best accounts of the develop-

The depression had a profound effect upon the hospitals of this country. As hospital income from endowments and contributions fell, demands on charitable facilities increased enormously. As a result, hospitals were stimulated to investigate any source that might promise even a slight amount of relief in order that essential community service might not be curtailed. A solution was found in the community selective plan which rapidly replaced the single-hospital plan. Hospital associations were created to furnish care for a predetermined fee.

The success of these plans was immediate. The original premium schedules provided by non-profit hospital associations were low. Secondly, with the presentation of evidence of membership in the association plan, it was not necessary to make advance payment for admission to a participating hospital. For these reasons, the growth of non-profit hospitalization plans was phenomenal. This was the origin of the Blue Cross movement in the United States.

As previously noted, the origin of medical care insurance in the United States dates from the late 19th century when firms engaged in dangerous and isolated industry entered into contractual relationships with hospitals and physicians for the medical care of their employees who were injured in the course of employment. Contracts in Washington and Oregon, that had originally intended to care for injuries arising in the course of employment, were later used to cover the ordinary medical care of employees.

It was not until the late Thirties that the Blue Shield program came into its own, for many of the same reasons that led to the origin of Blue Cross. Blue Shield Plans for the payment of surgical and nonsurgical medical care are prepayment programs sponsored by state or county medical associations. The removal of opposition by the American Medical Association eliminated a leading barrier to their development.

During the Thirties and Forties, various efforts were made on the state and national level to involve government in the field of medical care. Although the movement for national health insurance never succeeded, its impact was felt by the hospital associations, medical societies, and the insurance industry.

Environment Growth Factors

During the Second World War, the growth of voluntary health insurance was greatly accelerated. This acceleration was due to policies established by the Congress of the United States in relation to the Internal Revenue Code and also by federal wage stabilization policies.

Congressional Action

Congress, by allowing contributions to welfare plans to be tax-deductible as business expenses, encouraged the financing of these plans. Favorable tax treatment, together with the high income of corporations during the war period and the high rate of corporate and excess profits taxes, contributed to the establishment of many new welfare plans. Employers also realized that they could improve employer-employee relations by granting such benefits at a relatively low cost.

Wage Stabilization Policies

It was not until 1944-1945, that the policies of the War Labor Board greatly affected voluntary health insurance. Until that time, the War Labor Board had applied the "Little Steel Formula" to demands for wage increases. By 1944, most unions found that they could no longer ask for wage increases, as these had been exhausted under the "Little Steel For-

ment of hospital and medical plans see: Louis S. Reed, *Blue Cross and Medical Service Plans* (Federal Security Agency, U.S. Public Health Service, 1947).

mula." At this point, union demands shifted away from direct wage increases towards fringe benefits.[13]

The War Labor Board made it perfectly clear to the parties involved in collective bargaining that it would approve insurance plans if they were negotiated, but that in most cases it would not order the installation or liberalization of such programs. The basic reasoning behind the Board's policies with regard to the above plans was that they were not considered to be as inflationary as a direct wage increase.

It was felt that approval of a health and welfare plan, consisting of hospitalization and surgical-medical benefits did not increase employees' take home pay (though it usually raised employer costs and resulted in some higher prices). Also, approval of these plans might prevent demands for increased wage rates that would be inflationary and might lead to breakdowns in wartime production. The net result of War Labor Board policy was an increase in bargaining on fringe matters as the war came to a close.

The Post-War Years

The immediate demands by labor unions following the culmination of World War II were in the field of direct wage increases. With the death of the economic stabilization program, wage and price increases were almost continuous for the first three years following V-J day. By 1949, the inflationary period had levelled off and the economy was faced with a temporary recession. Many unions found it impossible to justify direct wage increases during the downturn and, therefore, initiated negotiations for security benefits, such as health and welfare plans and pension plans. In this respect, they were substantially aided by a series of decisions promulgated by the National Labor Relations Board and later upheld by the federal courts.

The first of these cases involved the Inland Steel Company. The issue in this case was whether a pension plan must be made the subject of collective bargaining between an employer and the representatives of its employees.[14] In a decision upheld by the United States Court of Appeals, the National Labor Relations Board ruled that a pension plan was a form of "wages" under Section 9(a) of the National Labor Relations Act. The company was ordered to bargain with unions on the matter of welfare benefits. The United States Supreme Court affirmed this position by refusing to review the decision of the Court of Appeals.

In a case involving the W. W. Cross Company, the National Labor Relations Board found the company guilty of an unfair labor practice by refusing to bargain over the matter of a group health insurance program.[15]

In a case involving General Motors, the NLRB, following established precedent, held that by acting unilaterally with regard to its group insurance contract, General Motors had refused to bargain collectively, in violation of Section 8(a)(5) of the Labor Management Relations Act of 1947.[16]

The direct consequence of these NLRB decisions, upheld by the federal courts, was to open an entirely new area to the field of collective bargaining. Undoubtedly, this has been one of the primary

[13] John T. Dunlop, "Appraisal of Wage Stabilization Policies," *U.S. Department of Labor*, Bulletin No. 1009, pp. 166-167.

[14] In the matter of Inland Steel Company and Local Union Nos. 1010 and 64, United Steel Workers of America, (CIO), 77 NLRB No. 1, 1948.

[15] In the Matter of W. W. Cross and Company, Incorporated and the United Steel Workers of America (CIO), 77 NLRB No. 188, 1948.

[16] In the Matter of General Motors Corporation, and the International Union of United Automobile, Aircraft and Agricultural Implement Workers of America, (UAW-CIO), 81 NLRB No. 126, 1949.

reasons for the growth of voluntary health insurance, especially as sold in group form.

Although recurrent proposals to establish a national health program were introduced in Congress throughout the Thirties, none received serious consideration until the late 1940's, when the Wagner-Murray-Dingell bills were pressed in Congress with the blessing of President Truman. These bills, which would have established a comprehensive compulsory system of federal health benefits, were defeated after a vigorous campaign against them led by the American Medical Association.[17] Undoubtedly, the failure of Congress to enact a national health program during the Truman administration resulted in increased trade union activity in the field of voluntary health insurance.

With the invasion of South Korea on June 25, 1950, a new period of federal regulation of labor-management relations began. The Wage Stabilization Board was created with the primary function of preventing inflationary wage increases.[18] In December, 1951, the Board liberalized its view on fringe benefits. Of great importance to organized labor was the provision that permissible contributions to health and welfare plans did not have to be offset against the increases allowed under other Board regulations.[19]

Since the end of the Korean war, the number of persons covered by some form of voluntary health insurance has continued to grow. Although the scope of available benefits in insurance contracts is being improved continuously, this does not mean that the problem of covering the costs of medical care has been solved. Innovations such as "major medical" or "catastrophic" insurance and "reasonable charge" plans[20] are to be welcomed. But certain low-income groups, such as the aged, are unable to purchase adequate basic coverage. In many instances the cost of adequate insurance is prohibitive. Inevitably, government must provide medical care for these groups. At the present time, this is accomplished through local public assistance programs with their demeaning "means" tests. If the private sector of the economy does not provide these low-income groups with adequate coverage, it is inevitable that some form of compulsory coverage, probably under the Social Security system, will be adopted by Congress.

Summary

The history of voluntary health insurance in the United States has been characterized by several stages of growth. In its earliest development, the experimental stage, it took the form of mutual aid societies established by workers themselves. In various hazardous employments, such as lumbering, mining and railroading, the earliest prepayment plans were developed.

The enactment of Workmen's Compensation legislation in the early part of the Twentieth century, influenced the development of in-plant health programs and prepaid medical care programs.

[17] Edwin J. Faulkner, *Health Insurance* (McGraw-Hill Book Company, Inc., 1960), p. 543.

[18] Isaac N. Grover, "The Legal Basis of Wage Stabilization Board Operations," *New York University 5th Annual Conference on Labor*, 1952; also Abraham Gitlow, *Wage Determination Under National Boards* (Prentice-Hall, Inc., 1953).

[19] Wage Stabilization Board, General Wage Regulation 19 and Resolution 78.

[20] Most major medical or catastrophic insurance plans include deductible and co-insurance features; e.g., the plan may not cover the first $500 of medical care costs (the deductible feature) but will cover 75 per cent (the co-insurance feature) of all expenses over $500 up to a maximum of $7,500. Many persons will purchase basic medical care insurance to cover the deductible portion of the major medical plan. Various Blue Shield plans are now selling reasonable charge plans under which no fee schedules are enumerated in the insurance contact. The plan promises to cover all "reasonable charges" made by the attending physician.

This first stage of growth came to an end with the failure of an abortive attempt to establish some form of compulsory health insurance during the second decade of the Twentieth century. Briefly, this failure was due to the opposition of the insurance and drug industries, the failure of the organized labor movement to support such a program and the failure of the American Medical Association to take an official position on the issue.

The second stage of growth coincided with the Great Depression which led to the rise of forces bringing persons into voluntary health insurance programs. During the Thirties, as a direct consequence of the Depression, hospitals found their endowments falling while demands on their charitable facilities were rising enormously. It became impossible for many hospitals to continue to use old billing procedures. To meet the demand for hospital care under these new economic conditions, hospital associations created organizations through which they agreed to furnish hospital care on a prepaid basis. Thus, voluntary health insurance had its "foot in the door." The immediate success of these plans, later to become known as Blue Cross, led medical societies and the insurance industry into the field of prepaid medical care.

Although the compulsory health insurance movement of the Thirties and Forties failed, it had its impact on the growth of voluntary health insurance. To combat this movement, medical societies, hospital associations and the private insurance industry introduced and improved plans of their own.

The third stage of growth may be described as one in which an environment developed leading to further growth. In the United States this occurred during the Second World War and in the postwar period. During the Second World War, wage stabilization policies of the National War Labor Board encouraged a number of labor unions and employers to establish fringe benefits, some in the form of health and welfare plans.

In 1948 and 1949, decisions of the National Labor Relations Board, upheld by the United States Supreme Court, declared that health and welfare plans were bargainable issues in collective bargaining. These decisions opened the door and many unions soon were negotiating insurance plans.

Over-all prosperous economic conditions since the early Forties have aided in the development of prepaid medical care plans. Thus it may be seen that both economic depression and prosperity have had a substantial impact upon the growth of voluntary health insurance in the United States.

What of the future? It appears that voluntary health insurance has been accepted by the American people. It has now reached a stage of development beyond that ever achieved anywhere else in the world. Although new types of coverage are being developed, there are still gaps in coverage. Low-income groups, such as the aged, are not adequately protected, primarily because of their financial inability to purchase adequate coverage. If the private sector of the economy does not provide adequate coverage for these groups, it is inevitable that government will step in to fill the vacuum, probably with some form of compulsory program.

In an attempt to placate the politically powerful senior citizen group in the United States, Congress amended the Social Security Act during the summer of 1960 to enable the states to provide medical care benefits to the "needy" aged under Public Assistance. Basically, the legislation increases federal grants-in-aid to the states for medical services for the 2.4 million aged persons now receiving Old Age Assistance. It also authorizes federal grants to the states for the pay-

ment of part or all of the medical services of such aged persons, who at one time or another, according to the states, may be in need of assistance in paying their medical expenses.

At this writing, very little has been done by the states, for two important reasons. In the first place, to become eligible for increased federal grants, the states must also provide additional funds. Many states are experiencing serious financial problems and have been unwilling to increase tax levies to obtain the additional funds. Secondly, Congressional action placing medical care for the aged under Social Security may be forthcoming in the present session of Congress. Until this issue is decided, very few states are willing to take any action under the existing federal legislation. Therefore, a realistic evaluation of the 1960 Social Security amendments is impossible.

On the whole, there does not appear to be at present any possibility of wholesale substitution of a government compulsory health insurance program for the existing voluntary programs. These programs will continue to expand as new types of coverage, such as major medical and reasonable charge plans, are introduced. Only in the event of a severe depression, similar to that experienced in the Thirties, is it likely that some form of a universal compulsory national health insurance program would be introduced in the United States.

SOME ELEMENTS OF A THEORY OF REINSURANCE

KARL BORCH

This paper will attempt to show that the so-called mathematical theory of risk is inadequate for proper analysis of the reinsurance problems which insurance companies have to deal with in practice. It will indicate how a more complete and possibly more useful theory can be developed by bringing in some elements of modern decision theory.

The theory of risk, which has been the pride of actuarial mathematics for almost a century, looks very impressive. In developing this theory, actuaries have overcome formidable mathematical problems and they have made important contributions to theoretical statistics. These by-products are probably of greater value than the theory itself, which has found few applications in practice. Most of the insurance world seems, with some justification, to consider the theory of risk as a harmless hobby cultivated by actuaries in Continental Europe and particularly in the Scandinavian countries. In a review article in a recent number of this *Journal*, Houston (6)[1] concludes that the contemporary theory of risk, in spite of its many attractions, can hardly be considered as "practical".

The purpose of developing a theory of risk was to obtain a scientific basis for determining the correct safety-loading of premiums and the optimum amount of self-retention in life insurance, two eminently practical problems. In this paper, the question of safety-loading will not be discussed. A full analysis of this problem will require some assumptions about the demand for insurance and its price elasticity. This in itself is a very difficult subject which cannot be taken up here without being diverted from the main purpose of this paper.

When an insurance company reinsures a part of its portfolio, it buys security and pays for it. The company will forego a part of its expected profits in order to reduce the possibility of inconvenient losses. The management of the company has to weigh expected profit against possible loss. To reach the right decision in such situations is the main problem in reinsurance, and on this point the theory of risk is of little help.

The Present Theory of Risk

A practical example from a paper by Hultman (7) will illustrate the problem. Examining the records of the Swedish life insurance company THULE over the years 1929-1931, Hultman found that the *probability of ruin* for the company would be 0.387 if the company had made no arrangements for reinsurance. Usually it is extremely difficult to calculate this probability of ruin, which plays a leading part in the modern, so-called "collective" the-

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[1] All references refer to the bibliography at the end of the article.

ory of risk, and Hultman's figure is an approximation, deliberately overestimated to be on the "safe side".

Hultman found that the average amount under risk on the insurance contracts in the company's portfolio was M = Swedish Kronor 4061. Hultman investigated what the probability of ruin would be under various reinsurance arrangements. Some of his results are given in Table 1.

TABLE 1

Maximum retention on one life	*Probability of ruin*
2 *M*	0.000 051
3 *M*	0.000 21
5 *M*	0.001 61
10 *M*	0.011 8
20 *M*	0.048 5
50 *M*	0.190
80 *M*	0.350
∞	0.387

Hultman and most other writers on the theory of risk, conclude their papers with a table of this kind. However, in spite of all the elegant mathematics which usually is displayed to calculate the probability of ruin, this is a rather sterile result. It is hard to imagine how a board of directors will use such a table when deciding what should be the maximum retention of their company. It is only in Finland that results of this kind seem to have found any important applications in practice. The Finnish Law of Insurance Companies of 1952 (§ 46) obliges the companies to keep an "adjustment reserve" calculated by the methods of the theory of risk.

In practice this means that the Government Inspector can order an insurance company to maintain adjustment reserves which are sufficient to keep the probability of ruin below a certain acceptable figure. So far no hard and fast rules have been laid down as to what ruin probability the Government Inspector will consider permissible for various types of companies. The principal reason appears to be that the probability can only be calculated approximately, and usually one knows little about how close the approximation may be. Another reason is that the practical significance of the probability of ruin is hard to grasp. By definition, the probability of ruin is the probability that the company shall be insolvent at least once, some time in the future, if there are changes neither in premium income nor in the basic probabilities underlying the claims, a very drastic *ceteris paribus* assumption.

In the example used by Hultman, the total amount of risk premium received by the company is Kronor 3 million. He assumes the safety-loading to be 10 per cent, so that the expected profit will be Kronor 300,000 if the company retains all risks for its own account. If the company reinsures a part of the larger risks, it is obvious that a part of expected profits will have to be passed on to the reinsurer, and Hultman assumes that the reinsurer requires a safety-loading of 15 per cent. On the basis of these assumptions, Table 2 has been constructed as perhaps having a bearing on the real problem of reinsurance as it appears to a board of directors.

TABLE 2

Maximum Retention	*Expected Profits*	*Probability of Ruin*
8 000	114 000	0.000 051
12 000	150 000	0.000 21
20 000	184 800	0.001 61
40 000	225 000	0.011 8
80 000	258 000	0.048 5
200 000	266 000	0.190
320 000	290 000	0.350
∞	300 000	0.387

This table illustrates how the management of an insurance company has to weigh expected profits against risk, measured by the probability of ruin, and decide on a maximum retention. Decisions of this kind have to be taken by managers in any kind of business, although they will hardly ever appear as clear cut as in the case of an insurance company.

Table 2 brings out the fact that the model considered in the theory of risk is very simple and quite arbitrary. The theory assumes that management con-

siders only two *decision parameters*, the probability of ruin, and another which usually is left unspecified, although tacitly assumed to be expected profits.

A More General Theory

It is easy to generalize the model described in the preceding paragraphs. Any portfolio of insurance contracts will define a probability distribution $F(x)$, where $F(x)$ is the probability that the total profits on the portfolio shall not exceed x. The function $F(x)$ can be determined in two ways:

(i) As in the classical theory of risk, by building up $F(x)$ from the probability distributions defined by the individual contracts in the portfolio.
(See Cramer (3).)

(ii) As in the collective theory of risk, by estimating the probability that a claim shall occur in a unit interval of time, and by determining the probability distribution of the size of the claims which occur.
(See Cramer (4).)

For practical purposes, the latter method is obviously the easiest to apply. The data required can be obtained without difficulty from the records kept by any insurance company.

The two decision parameters of Table 2 are easily expressed by $F(x)$:

$$\text{Expected profits} = \int_{-\infty}^{+\infty} x\,dF(x)$$

$$\text{Probability of ruin} = \int_{-\infty}^{-S} dF(x)$$

where S is the total assets of the company. If profits are smaller than $-S$, the company will obviously be ruined.[2]

Assume now that a company considers a proposed reinsurance arrangement which will change the probability distribution of its portfolio from $F(x)$ to $G(x)$. It is obvious that the company will accept this arrangement only if in some way $G(x)$ is considered as "better" than $F(x)$. To select the best among a number of possible reinsurance arrangements is therefore the same problem as that of selecting the best in a set of probability distributions. The basic assumption of the theory of risk so far has been that when selecting the best probability distribution, it is sufficient to consider only the two parameters referred to above, and that all other properties of the probability distribution can be ignored. This assumption can, at best, be only a first approximation to a realistic analysis of reinsurance problems.

To give some meaning to the term "the best probability distribution," it is necessary to assume that an insurance company has some rule or standard which enables it to rank probability distributions according to their "goodness." In principle it is sufficient to assume that the set of all probability distributions is *completely ordered* with regard to the company's preference. This assumption implies the following:

(i) When confronted with two probability distributions $F(x)$ and $G(x)$, the company is able to decide either that one of the distributions is better than the other, or that the two distributions are equally good.

(ii) If a company considers $F(x)$ as better than $G(x)$, and $G(x)$ as better than $H(x)$, it will also consider $F(x)$ as better than $H(x)$.

It seems almost self-evident that these assumptions must hold for any rationally managed insurance company. Now let $U(F(x))$ be a function defined for any probability distribution, such that

$$U(F(x)) < U(G(x))$$

if, and only if $G(x)$ is better than $F(x)$. $U(F(x))$ will be referred to as the *utility* function of $F(x)$.

[2] The ruin probability in Hultman's table is defined in a different way. It is however not necessary to discuss the point for the purpose of this paper.

Consider now the degenerate probability distribution $\epsilon(x\text{-}R)$ defined by

$$\epsilon(x-R) = 0 \quad \text{for } x < R$$
$$\epsilon(x-R) = 1 \quad \text{for } x \geq R$$

The utility of this distribution, $U(\epsilon(x\text{-}R))$ will then be the utility attached to the certainty of a profit R, and it is convenient to write $U(\epsilon(x\text{-}R)) = u(R)$.

If in addition to the assumptions made in the preceding paragraph, an assumption of continuity is also made, it follows that $u(R)$ is determined up to a linear transformation, and that

$$U(F(x)) = \int_{-\infty}^{+\infty} u(x)d\ F(x)$$

This result is usually referred to as the Bernoullian hypothesis. It gives the utility of a probability distribution expressed by the utility of events which are certain, or colloquially it states that the utility of a lottery ticket equals the weighed sum of the utilities of the prizes, and that the weights are the probabilities of gaining the various prizes. The assumptions leading to this result can be given in different forms. The most elegant derivation of the result is probably the one given by Herstein and Milnor (5).

The function $u(x)$ is usually referred to as the *utility of money*. It should be seen as an operator establishing an ordering over the set of all possible probability distributions, unless one is prepared to attach a meaning to statements such as: A profit of 2 million dollars is 10 per cent better than a profit of 1 million dollars.

At this stage it is convenient to make a slight change of notation:

Let $F(x)$ stand for the probability that the amount of *claims paid* under the contracts in the portfolio shall not excede x. In order to assume responsibility for this portfolio, the company has received a net premium

$$P = \int_0^\infty x dF(x).$$

In addition to the funds P, which the company must have in order to be solvent, it is assumed that the company has funds amounting to R. R will be referred to as the company's "free reserves".

The *risk situation* of the company is then completely determined by the following three elements:

(i) Its underwriting responsibility, represented by the function $F(x)$, referred to as the *risk distribution.*
(ii) Its technical reserves P.
(iii) Its free reserves R.

The utility which the company attaches to this situation will be:

$$\int_0^\infty u(R + P - x)d\ F(x)$$

Assume now that the company makes a reinsurance arrangement such that if a claim amounting to x occurs, the company will itself only pay the amount $y(x)$. The difference $x\text{-}y(x)$ will be paid by the reinsurer. It is easy to see that this arrangement will change the utility of the company to

$$\int_0^\infty u\ (R + P - y(x))d\ F(x)$$

$y(o)$, the amount to be paid if no claim occurs, can obviously be interpreted as the *price* which the company pays for reinsurance coverage. If there exists a reinsurance market where a company can obtain any kind of reinsurance coverage at a uniquely determined price, the company's problem would be to maximize its utility in the same way as consumers do in classical economic theory. However, it is by no means obvious that such a market exists, and this general problem will not be tackled in all its complexity. Instead, the simplest possible case will be analyzed in detail, that of two companies which seek to negotiate an agreement for exchange of risks, to the benefit of both

parties. In insurance terminology, this is the case of two companies which negotiate a reciprocal reinsurance treaty. In the "Theory of Games" (9), the situation is referred to as a "Two-person Co-operative Game."

Now let the risk situation of Company 1 be determined by the elements

$$F_1(x_1),\ R_1 \text{ and } P_1$$

where

$$P_1 = \int_0^\infty x_1 d\ F_1(x_1)$$

Assume further that the utility which the company attaches to an amount x of money is $u_1(x)$

For Company 2 we have in the same way:

$$F_2(x_2),\ R_2,\ P_2 \text{ and } u_2(x).$$

Assume that x_1 and x_2 are stochastically independent. The purpose of the negotiations between the two companies is to agree on a function $y(x_1, x_2)$. If the claims occurring in the two portfolios amount to x_1 and x_2 respectively, Company 1 will pay the amount $y(x_1, x_2)$, and Company 2 the remainder of the claims, i.e. $x_1 + x_2 - y(x_1, x_2)$.

It is clear that Company 1 will seek agreement on a function $y(x_1, x_2)$ which makes the expression:

$$\int_0^\infty \int_0^\infty u_1(R_1+P_1-y(x_1, x_2))\, d\ F_1(x_1) d\ F_2(x_2) = U_1(y)$$

as great as possible. On the other hand, Company 2 will seek to maximize the expression:

$$\int_0^\infty \int_0^\infty u_2(R_2+P_2-x_1-x_2+y(x_1, x_2))\, d\ F_1(x) d\ F_2(x) = U_2(y)$$

It is evident that the interest of the two companies, to some extent, are opposed, and that they will have to negotiate their way to a compromise. If the two companies proceed in a rational manner, their first step will be to discard all functions which can be considered as *non-efficient* solutions to their problem. It can be said that a function $\bar{y}(x_1, x_2)$ is non-efficient if there exists another function $y(x_1, x_2)$ which gives both companies a higher utility. If no such function exists, it can be concluded that $\bar{y}(x_1, x_2)$ is an efficient solution to the bargaining problem.

It has been shown in a previous paper (2) that a necessary and sufficient condition that $y(x_1, x_2)$ is an efficient solution, is that it satisfies the condition

$$u_1'(R_1 + P_1 - y(x_1, x_2)) = k u_2'(R_2 + P_2 - x_1 - x_2 + y(x_1, x_2))$$

where k is a positive constant. This general equation will not be discussed. Instead, the principles will be illustrated by analysis of a special case.

A Special Case

Let it be assumed that the utility of money to the two companies is given by:

$$u_1(x) = -a_1 x^2 + x$$
$$u_2(x) = -a_2 x^2 + x$$

Utility functions of this form have been studied in a previous paper (1), and they seem to give satisfactory results.

In this case the condition for an efficient solution becomes:

$$2a_1(R_1 + P_1 - y(x_1, x_2)) - 1 = 2a_2 k(R_2 + P_2 - x_1 - x_2 + y(x_1, x_2)) - k$$

which gives:

$$y(x_1, x_2) = \frac{2a_1(R_1+P_1) - 2a_2k(R_2+P_2) + 2a_2k(x_1+x_2) + k - 1}{2(a_1+a_2k)}$$

$$= \frac{a_2k}{a_1+a_2k}(x_1+x_2) + \frac{a_1}{a_1+a_2k}P_1 - \frac{a_2k}{a_1+a_2k}P_2 + \frac{2a_1R_1 - 2a_2kR_2 + k - 1}{2(a_1+a_2k)}$$

To simplify this expression the following symbols are introduced:

$$h = \frac{a_1}{a_1 + a_2k},\quad 1 - h = \frac{a_2k}{a_1 + a_2k}$$

$$Q = \frac{2a_1R_1 - 2a_2kR_2 + k - 1}{2(a_1 + a_2k)}$$

$$= (1 - h)\left(\frac{1}{2a_2} - R_2\right) - h\left(\frac{1}{2a_1} - R_1\right)$$

One can then write:

$$y(x_1, x_2) = (1-h)(x_1+x_2) + hP_1 - (1-h)P_2 + Q$$

It is easy to see that the reciprocal reinsurance treaty defined by this function, is an exchange of quota shares, where the quotas which are ceded add up to unity. Company 1 cedes to Company 2 a quota of $100h$ per cent of its net premium P_1. If claims amounting to x_1 occur in the portfolio of Company 1, a corresponding quota will be paid by Company 2. Company 1 itself will pay only the remainder $(1-h)x_1$. In the same way, Company 2 will cede a quota of $100(1-h)$ per cent to Company 1.

The last term Q, which may be positive or negative, represents a net transfer of free reserves from Company 1 to Company 2.

When the utility function has the special form introduced in the first paragraph of this section, the initial utility of Company 1 is:

$$U_1(O) = \int_0^\infty u_1(R_1 + P_1 - x_1)dF_1(x_1)$$

$$= \int_0^\infty [-a_1(R_1+P_1-x_1)^2 + (R_1+P_1-x_1)]dF_1(x_1)$$

$$= -a_1 \int_0^\infty [R_1^2 + 2R_1(P_1-x_1) + P_1 - x_1)^2]dF_1(x_1)$$

$$+ \int_0^\infty (R_1+P_1-x_1)dF_1(x_1)$$

$$= -a_1R_1^2 - a_1 \int_0^\infty (P_1-x_1)^2 dF_1(x_1) + R_1$$

which by some rearrangement can be written:

$$U_1(O) = \frac{1}{4a_1} - a_1\left(\frac{1}{2a_1} - R_1\right)^2 - a_1V_1$$

where

$$V_1 = \int_0^\infty (x - P_1)^2 \, d\, F_1(x)$$

is the variance of the company's risk distribution. It is easy to verify that the reinsurance treaty defined by $y(x_1, x_2)$ will give the company a utility:

$$U_1(y) = \frac{1}{4a_1} -$$

$$a_1(1-h)^2 \left[\left(\frac{1}{2a_1} + \frac{1}{2a_2} - R_1 - R_2\right)^2 + V_1 + V_2\right]$$

For Company 2, the same procedure shows:

$$U_2(O) = \frac{1}{4a_2} - a_2\left(\frac{1}{2a_2} - R_2\right)^2 - a_2V_2$$

and

$$U_2(y) = \frac{1}{4a_2} - a_2h^2\left[\left(\frac{1}{2a_1} + \frac{1}{2a_2} - R_1 - R_2\right)^2 + V_1 + V_2\right]$$

The subject of the negotiations between the companies is reduced to reaching agreement on a value of h. It is evident that Company 1 will try to get agreement on the largest possible value of $h \leq 1$, and that Company 2 will hold out for a value of h as small as possible.

If the companies act rationally, neither of them will accept a treaty which gives a lower utility than the company has in the initial situation, i.e. before any treaty is concluded. Hence we must have

$$U_1(O) \leq U_1(y)$$

$$U_2(O) \leq U_2(y)$$

These inequalities will define an interval for the values of h which are acceptable to both companies.

However, which value of h within the interval, which the companies finally will agree upon cannot be determined without making some assumptions about the manner in which the negotiations are carried out.

Nash (8) has given an elegant proof that under some general and very acceptable assumptions rational bargainers will agree

upon the value of h which maximizes the product

$$[\, U_1(y) - U_1(O)\,] \quad [\, U_2(y) - U_2(O)\,]$$

This solution will not be discussed further. Its meaning will become clear in the following paragraphs.

It may be useful to discuss a simple numerical example to illustrate the results.

Let $R_1 = 1$, $R_2 = 3$ and $V_1 = 1$, $V_2 = 3$.

Assume that the two companies have the same attitude to risk, and let

$$a_1 = a_2 = \tfrac{1}{6}$$

It is evident that Company 2 is considerably better off than Company 1. If the initial utilities are calculated by the formulae given earlier, they are found to be respectively ¾ and $\frac{3}{2}$. To avoid unnecessary fractions, multiply all utilities by 8, (a change of unit measurement) so that the situation can be written:

$$U_1(O) = 6 \text{ and } U_2(O) = 12$$

If the companies conclude an efficient reinsurance treaty, the utilities will become:

$$U_1(y) = 16 - 20(1 - h)^2$$

$$U_2(y) = 16 - 20h^2$$

where h must lie in the interval

$$0.29 \leq h \leq 0.49$$

We find further $Q = 1 - 4h$

The Nash solution is the value of h which maximizes the product

$$[\, 10 - 20(1 - h)^2\,] \quad [\, 4 - 20h^2\,]$$

This value will be determined by a third-degree equation which has only one root between 0 and 1. This root is found to be approximately $h = \frac{3}{8}$. The corresponding transfer of free reserves is $Q = -0.5$.

Assume now that the two companies have realized that the efficient arrangement is to exchange quota shares which add up to unity. This really means that the companies pool their portfolios and divide claims against the pool between themselves, in a fixed proportion, and it is fairly easy to realize that this arrangement will give the best spread of risk. It is not so obvious how Q, the transfer of free reserves should be determined. For this purpose, simply assume that the companies make some arrangement. They can for instance agree that only net premiums should be paid for reinsurance cover, i.e. that $Q = 0$, or they can agree to calculate Q by adding a proportional loading to the net premiums ceded.

Table 3 gives the utilities of the two companies for some selected values of h and Q. The upper figure in each box gives the utility of Company 1 and the lower figure the utility of Company 2. The figures representing efficient solutions are set in italics. The Nash solution, corresponding to $h = \frac{3}{8}$ and $Q = -0.5$ gives utilities 8.19 and 13.19. It clearly represents a deal which two rational bargainers might settle for.

TABLE 3

UTILITIES OF THE TWO COMPANIES BY VARIOUS REINSURANCE ARRANGEMENTS

h / Q	−1.0	−0.75	−0.5	−0.25	0	+0.25
⅛	8.96	7.90	6.71	5.39	3.96	2.40
	11.94	12.88	13.69	14.40	14.96	15.90
¼	9.75	8.69	7.50	6.18	*4.75*	3.19
	11.75	12.69	13.50	14.19	*14.75*	15.69
⅜	10.44	9.38	*8.19*	6.87	5.44	3.88
	11.44	12.38	*13.19*	13.88	14.44	15.38
½	*11.00*	9.94	8.75	7.43	6.00	4.44
	11.00	11.96	12.75	13.44	14.00	14.94
⅝	11.44	10.38	9.19	7.87	6.44	4.88
	10.44	11.38	12.19	12.88	13.44	14.38
¾	11.75	10.69	9.50	8.18	6.75	5.19
	9.75	10.69	11.50	12.19	12.75	13.69
⅞	11.94	10.88	9.69	8.37	6.94	5.38
	8.96	9.90	10.71	11.40	11.96	12.90

This table shows a whole range of possible agreements. However, only the agreements corresponding to the figures within the contour will have practical interest, since they alone will give *both* companies a higher utility than they have

in the initial situation. The table brings out clearly that some preconceived idea, for instance that only net premiums should be paid to the reinsurer, can lead to non-efficient solutions. The column corresponding to $Q = 0$ is clearly non-efficient, since the columns to its left contain pairs which give both companies higher utility.

It has been assumed that each company has full knowledge of its own risk situation, as well as of the other party's. This is a reasonable assumption. It is not usual in reinsurance negotiations to hide information from the other party. There may be uncertainty about how one should evaluate some of the probabilities which enter into the risk distributions. However, it is still reasonable to assume that, having considered all the available information, the two companies arrive at the same evaluation of these probabilities.

It has also been assumed that both companies know the shape of the utility function which the other party seeks to maximize. This may be a dangerous assumption. There is nothing to prevent a company, during some reinsurance negotiation, from hiding its real motives from the opponent, and this may bring substantial advantages. This can be illustrated by an example.

If the utility function has the form $-ax^2+x$, it is clear that the smaller a is, the less worried will the company be about risk. In the limiting case $a = 0$, the company will not be concerned with risk at all. Its sole objective will be to maximize expected profits.

Assume now that in reality the two companies' attitude to risk is such that $a_1 = a_2 = \frac{1}{8}$ as in our example, but that Company 1 is able to give the impression that in its utility function $a_1 = \frac{1}{6}$. This means essentially that Company 1 pretends to be more worried over risk than it really is, and exacts a higher compensation for the reinsurance cover it gives to Company 2. If the bluff succeeds, and if the two companies, through some rational bargaining procedure, arrive at a Nash solution as a best possible deal, this will be the solution corresponding to $a_1 = \frac{1}{6}$ and $a_2 = \frac{1}{8}$. From the general formulae already given, the solution is found to be approximately

$$h = 0.5 \text{ and } Q = -0.5$$

Table 3 shows that this solution will give Company 1 a higher utility than $h = \frac{3}{8}$ and $Q = -0.5$, the solution corresponding to the true situation $a_1 = a_2 = \frac{1}{8}$. In other words, Company 1 has made a gain at the expense of Company 2, by hiding its real objectives.

This problem does not need to be discussed in more detail. It is obvious that possibilities of deceiving the opponent exist in most bargaining situations in real life, and a realistic theory of reinsurance should take account of such possibilities.

Conclusion

One who studies the theory of risk, inevitably becomes impressed by the brilliant mathematical analysis so many actuaries have produced in order to calculate the probability of ruin. However, one is also a little surprised that they hardly ever take time to explain why and how this probability is relevant to the decisions which are made by the management in an insurance company. This trivial question is pushed aside for the fascination of mathematical display.

A paper by Tauber (10) at the Sixth International Congress of Actuaries is typical in this respect. Tauber presented his paper in Vienna in 1909 when the Austrian school of economics had its heyday. It was therefore natural that he should begin with some introductory words to the effect that a reinsurance contract is a purchase of security, and that security like all other commodities must have its price. This price must be determined by supply and demand, i.e. by cost and utility. If Tauber had followed

up this idea, the "theory of games and economic behaviour" might have begun in Vienna in 1909 and not at Princeton in 1944. However, he dropped the subject, and after his two-page introduction, Tauber presents 60 pages of mathematics which has no bearing on the general problem which he formulated in a surprisingly modern manner.

The mathematical tools which Tauber needed to solve his problems have since been developed outside the insurance world. The purpose of this paper has been to show that these tools can be applied to the problems of reinsurance, and that they may help in gaining a deeper understanding of the mechanism of reinsurance markets.

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LOSS DISTRIBUTIONS IN NON-LIFE INSURANCE*

"There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy." William Shakespeare—*Hamlet*

O. D. Dickerson, with Shriniwas K. Katti and Alfred E. Hofflander

A few years ago Irving Pfeffer pointed out that insurance theory may be divided into three main areas: the mathematical-actuarial, the psychological, and the economic or business administration area.[1] For the last several years, with the financial support of a large insurance company and Florida State University, the author of this paper has been engaged in research endeavoring to identify and elucidate the fundamental principles of insurance mathematics and to develop a unified body of insurance theory working from these principles towards their practical application to problems of rate making and related areas. The associate authors listed have contributed significantly to these efforts from time to time. The purpose of this paper is to bring to general attention one of the most fundamental points in the theory of insurance mathematics, namely the concept of the compound distribution.

In any mathematical theory of insurance it is recognized that the occurrence of loss is a random variable. What is not so generally recognized is that, in most lines of insurance, the amount of loss is also a random variable. As Professor Houston pointed out[2] the two random variables interact together to produce a third random variable. The purpose of this paper is to explain the nature of this interaction between the frequency distribution of the random variable representing the probabilities of occurrence of loss and the frequency distribution of probabilities of various amounts of loss. Professor Houston used the term "multiply" to explain the nature of this interaction and on a later page referred to the "n—fold convolution of P (y) with itself." On the other hand, most statisticians discuss convolutions (sometimes called "faltungs", "composed functions" or "asterisk multi-

* This study was supported in part by funds provided under Contract AF 41(657) -342 with the School of Aviation Medicine, U.S.A.F., Randolph Air Force Base, Texas.

[1] Pfeffer, Irving "The Nature and Significance of Insurance Principles," *C.P.C.U. Annals*, Vol. 10, No. 1, January 1958.

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[2] Houston, David B. "Risk Theory," *The Journal of Insurance*, Vol. 27, No. 1, March 1960, p. 77.

plication") in terms of a summation of a series of random variables. The main author suspects that others have been as confused as he about these different approaches to the mathematical relationship which lies at the heart of insurance theory.

Fortunately for the application of insurance theory to the practical world, the mean (arithmetic mean) of the resulting compound distribution is equal to the product of the means of the underlying distributions of probability of loss and amount of loss respectively.[3] In terms of insurance this can be expressed by the statement that the pure premium is equal to the probability of loss times the expected amount of loss. This is true for all lines of insurance. Life insurance is a special case where, if the unit of exposure be taken as the human life, the amount of loss is always 1.0. A similar situation might prevail in certain types of property loss where every loss was inevitably total. One application of this in the literature is in regard to fire insurance on rural buildings.[4] However, in most lines of insurance, losses are not necessarily total and moreover it is possible to have more than one loss occur to any given unit of exposure in a policy period. Thus, with the exceptions noted, two distributions leading to a resulting compound distribution are involved.

The evaluation of a compound distribution is quite difficult. In the insurance application, a given dollar amount of total loss to the insurer may be achieved in quite a number of ways. In order to evaluate all of the possible ways in which losses of all possible magnitudes occur, it would be necessary to multiply every possible number of losses by every possible average (value of loss). This would determine the magnitudes of the various possible total losses. Similarly, it would be necessary to multiply the probability of occurrence of each of these various numbers of losses by the probability of occurrence of each of the possible amounts of loss, to give the probability of each of the dollar losses representing the gross products described in the sentence above. The magnitude of this operation in any practical problem would be tremendous.

However, this is only half of the battle. A given total dollar loss can be produced in many possible ways. For example, a $10,000 loss could be produced by one hundred $100 losses, by ten $1,000 losses, by two $5,000 losses, etc., etc. In order to obtain the total probability of a loss of $10,000 (and of any other amount) it is necessary to add all of the separate probabilities for all of the different conceivable ways in which the total of $10,000 can be obtained. Thus, the process involves the summation of a (perhaps very large) series of gross products. This explains why some authors refer to this process as multiplication while others refer to it as summation.

In Appendix 2 of this paper a very simple illustration of this process is presented. In the analogy to insurance theory $f_x(x)$ represents the frequency function for the occurrence of loss. Its mean is what we usually refer to as the "probability of loss." On the other hand, $f_y(y)$ represents the frequency function for the distribution of possible amounts of loss. Its mean is what we usually refer to as the "average amount of loss" or the "expected loss." The compounding of these two distributions $f_x(x) * f_y(y)$ produces $f_s(z)$ the frequency function representing the distribution of possible amounts of loss for the insured group as a whole. The illustration is, of course, not drawn from actual insurance data since these would involve mathematics far too complex to

[3] See Appendix 1 to this paper.

[4] Johansen, Paul "On Fire Insurance of Rural Building," *Transactions XVth International Congress of Actuaries*, Vol. 2, pp. 211 ff.

present in full detail in a paper so brief. It represents a very simple dice game and it is hoped that a study of this will make it possible for the reader to picture clearly in his mind the nature of this compounding process. The illustration might also be valuable as a teaching aid in courses where an advanced treatment of insurance theory is undertaken. One suspects, however, that it should not be included in these terms in the typical "principles of insurance" course.

The first conclusion to be derived from a study of compound distributions is the extreme mathematical complexity involved in evaluating them. The second, and more tentative, conclusion is the extreme skewness of the resulting distribution. The long "tail" to the right is a characteristic of compound distributions.[5] This would be so in a greater degree, apparently, in insurance distributions where both of the underlying frequency functions are considerably skewed in themselves. As a result of this skewness, the variance of the compound distribution is greater than that found in most ordinary distributions. For the magnitudes involved in the illustration in Appendix 2, the variance turns out to be more than twice as great as would be the case if the $f_z(z)$ distribution were a Poisson or a simple binomial. If this relationship be found to prevail in the magnitudes which are practical of application in insurance theory, we would expect that the probable variation from the expectation of total claims for a group of risks for a company would be about twice as great in non-life insurance as in life insurance. This well may add one more sound reason for the often observed fact that life insurance company results seem to be predictable more easily than those for non-life companies. The implications of this for determining the amount of surplus required to cover probable variations and desirable retentions and reinsurance limits are obvious.

Fortunately, it is possible to learn something about compound distributions without resorting to the laborious techniques of cross multiplication and summation that are required for finding the compound distribution by the direct method. This can be accomplished by means of moment generating or characteristic functions. In general, the moment generating function of a random variable is defined as $m_x(t) = E(e^{tx})$. For a discrete distribution this means

$$m_x(t) = \sum_{-\infty}^{+\infty} e^{tx} f_x(x),$$

and for a continuous function

$$m_x(t) = \int_{-\infty}^{+\infty} e^{tx} f_x(x)\,dx$$

Since for any t the quantity $e^{tx}f_x(x)$ is a positive function of x, the integral is either finite or infinite. If the integral is finite, we say that the moment generating function exists (*i.e.* there is some value of t such that $m_x(t)$ is finite.) Then all moments of the distribution exist. In the above formulae, t is a real auxiliary variable.

If the successive derivatives of the moment generating function are formed by successively differentiating under the integral or summation sign then the moments are equal to these derivatives evaluated at $t = 0$. That is to say the first moment about the origin (the mean) is equal to the first derivative, the second

[5] See: Feller, W., "On A General Class of Contagious Distributions," *Annals of Mathematical Statistics*, 14:389-400 (1943) for a proof that in a compound Poisson distribution variance is always greater than the mean, regardless of the nature of the compoundant [our $f_y(y)$]. See Katti, S. K. and Gurland, John, "The Poisson Pascal Distribution," to be published in *Biometrica, ca.* 1961 for a demonstration that many of the usual compound distributions tend to have high positive skewness.

moment about the origin (the root mean square of the function) is equal to the second derivative, etc.

The moment generating function will exist if such a finite t exists or if $f_x(x)$ tends sufficiently strongly to zero as x approaches plus or minus infinity. Where neither of these conditions exists, it is necessary to use the characteristic function $h_x(t) = m_x(it) = E\ (e^{itx})$. This extends the function over the imaginary domain and completely avoids the convergence problem. Otherwise, it is used just as the moment generating function. The moments that exist are obtained just as in the case of the moment generating function, except that (it) is used as the auxiliary variable instead of (t). The derivatives then are evaluated with respect to (it) at (it) = 0.

Moment generating functions and characteristic functions are very powerful tools. In their application to the instant problem, it is sufficient to indicate one of their most important attributes, namely that in any summation of random variables the characteristic function of the resulting distribution is equal to the product of the characteristic functions of the underlying distributions. In our particular application, a related technique is used in Appendix 1 to demonstrate that the mean of the compound distribution is equal to the product of the means of the $f_x(x)$ and $f_y(y)$ distributions. Similarly, the variance of the compound distribution is equal to the sum of the product of the square of the mean of the y distribution times the variance of the x distribution plus the mean of the x distribution times the variance of the y distribution. Because the mean of the y distribution enters in as a square rather than at its original value the variance of the compound distribution will be considerably greater than would be the case for most standard distributions.

Where the x distribution is a Poisson distribution, it is obvious that the z distribution will be a compound Poisson. The most commonly known example of the compound Poisson distribution is the negative binomial. For some insurance applications it is possible that the negative binomial would prove a good fit to the total loss or $f_z(z)$ curve. This is a question which would bear further investigation.

The difficulty in applying these theories to practical insurance problems is lack of knowledge as to the distributions underlying respectively the curves of probability of loss and the curves of possible amounts of loss. For the former it seems that the binomial distribution is appropriate if the nature of the insurance is such that no unit can have more than one claim during the exposure period. On the other hand, if a unit may have more than one claim during the exposure period the Poisson distribution seems to be indicated by theoretical considerations. Where the exposures are not homogeneous but where the underlying probability of loss may vary, certain assumptions lead to the use of the negative binomial as the $f_x(x)$ curve.[6] Specifically, the negative binomial results from the assumption that the probability of an accident varies in the population according to the distribution of a Pearson type 3 curve. It may be derived in other ways.

This gives three possible models for the $f_x(x)$ curve. There may, of course, be many other possibilities. The shape of the distribution of amounts of loss is not so

[6] Dropkin, Lester B., "Some Consideration on Automobile Rating Systems Utilizing Individual Driving Records," *Proceedings of the Casualty Actuarial Society*, Volume 46, p. 165. Bischel, F., "Une Methode pour Calculer une Ristourne Adéquate pour Années sans Sinestres," *The ASTIN Bulletin*, Vol. I, Part II, pp. 106-122; Delaporte, Pierre, "Quelques Problémes de Stastique Mathematique posés par l'Assuranse Automobile et le Bonus pour non Sinistre," *Bulletin Trimestriel de l'Institut des Actuaires Français*, No. 227, pp. 87-102 (Juin, 1959); Thyrion, P., "Contribution a l'Etude du Bonus pour non Sinistre en Assurance Automobile," *The ASTIN Bulletin*, Vol. I, Part II, pp. 142-162.

clearly indicated by theory. It is clear that it is usually quite skewed, however. Several studies seem to indicate that, for a quite diverse variety of types of insurance, the log-normal curve is a reasonably good fit. Three such published studies are those by Beard[7] (contents fire losses in Denmark), Benckert[8] (Business interruption losses in Sweden) and Mehring[9] (auto liability in Germany). Other unpublished data available to the author seem to indicate that this curve gives a reasonably good fit for automobile physical damage losses in the United States and for bodily injury liability awards in the courts of Dade County, Florida. In the latter case, the fit is distorted by a concentration of awards around certain round sums such as $5,000 and $10,000. Other possible functions suggested for the $f_y(y)$ curve include the Pareto type[10] and the log-Pearson type I distribution.[11] Almer[12] develops approximation formulae for the $f_y(y)$ curves making use primarily of various exponential polynomials. He points out that as the data become large enough, the total loss distribution $f_z(z)$ converges ultimately to simpler forms ending finally with the normal distribution. He guesses that reasonably appropriate fits can be obtained for the following curves for the following amounts of claims:

0– 100	Claims within the risk class-exponential tetranomial	and corresponding Bessel functions
100– 1,000	claims within the risk class-exponential trinomial	
1,000–10,000	claims within the risk class-exponential binomial	
> 5,000	claims by the Esscher formulas which have some inner relation to binomials	
>10,000	claims within the risk class-exponential monomials	
[> 50,000	claims—Normal distribution functions]	

Obviously, there is a great need for further studies in these areas to determine what types of curves provide reasonably good approximations for these three distributions in various lines of insurance. If a standard distribution or a family of standard distributions can be found, this would have tremendous value in practical application, particularly as to contingency reserves, catastrophe loadings, reinsurance and retention, and questions of credibility.[13] Any readers of this paper who may have actual distributions of probability of loss $f_x(x)$ amount of loss $f_y(y)$ or total losses $f_z(z)$ are urgently requested to communicate with the author in the hopes that some valid generalizations as to the appropriate shapes of these curves may be obtained. Much further study will be required before

[7] Beard, R. E., "Analytical Expressions of the Risks Involved in General Insurance," *Transactions XVth International Congress of Actuaries*, Volume 2, p. 230.

[8] Benckert, Lars G., "The Premium in Insurance Against Loss of Profit Due to Fire as a Function of the Period of Indemnity," *Transactions XVth International Congress of Actuaries*, Volume 2, p. 297.

[9] Mehring, Johannes, "Die Versicherung von Kraftfahrschäden in der Bundesrepublik Deutschland," *Transactions XVI International Congress of Actuaries*, Vol. II, p. 5.

[10] Benckert, Lars G., and Sternberg, Ingvar, "An Attempt to Find an Expression for the Distribution of Fire Damage Amount," *Transactions XVth International Congress of Actuaries*, Volume 2, p. 288.

[11] Beard, *op. cit.*

[12] Almer, Bertil, "Risk Analysis in Theory and Practical Statistics," *Transactions XVth International Congress of Actuaries*, Vol. 2, p. 314.

[13] See, *e.g.*, Beard, R. E., "Three R's of Insurance—Risk, Retention and Reinsurance," *The Journal of the Institute of Actuaries Students' Society*, Vol. 15, Part 6, p. 399.

these questions can be resolved with any degree of accuracy. However, their theoretical interest and value in application is such that this effort definitely is justified. It is hoped that this paper will stimulate more people to think about these problems. The larger the number of minds that can be brought to bear upon these questions, the more quickly and more effectively the mathematical model or models for insurance theory may be developed.

APPENDIX 1

Mean and Variance of Compound Distributions

The following derivation is applicable to any compound distribution. However, to dramatize the application to insurance, let us consider x as representing the number of accidents per year and y, the amount paid in any particular accident. Let $f_x(x)$ and $f_y(y)$ represent their frequency functions or probability densities. For any function $f_x(x)$, the probability generating function $g_x(t)$ (abbreviated to p.g.f.) is given by

$$g_x(t) = \int_{x=-\infty}^{+\infty} t^x f_x(x)\, dx$$

or

$$= \sum_{x=-\infty}^{+\infty} t^x f_x(x) \qquad (1)$$

according to whether x is a continuous or discrete variable.[14] Here t is an auxiliary variable. It is to be noted that if $m_x(t)$ is the moment generating function of x, then $g_x(t)$ is related to $m_x(t)$ through the relation

$$g_x(t) = m_x(\log(t)) \qquad (2)$$

i.e. the p.g.f. is obtained by substituting log (t) for t in the moment generating function.

Let $g_x(t)$ and $g_y(t)$ represent the p.g.f.s of x and y respectively. For simplicity of notation, discrete variables only will be considered here. However, it should be clear that the results are equally valid for continuous variables.

Suppose that x accidents occurred in some year and that amounts $y_1, y_2, ---, y_x$ were paid for the 1st, 2nd, ---, xth accidents respectively. Hence, the total amount z paid is given by

$$z = y_1 + y_2 + --- + y_x \qquad (3)$$

and the p.g.f. of z is given by

[14] Cf. Lukacs, Eugene, *Characteristic Functions*, London: Charles Griffin & Co. Ltd., 1960.

$$\begin{aligned}
g_z(t) &= \sum_{z=0}^{\infty} t^z \left\{ \text{probability of paying } z \right\} \\
&= \sum_{x=0}^{\infty} \sum_{z=0}^{\infty} t^z \text{ prob } \left\{ z \text{ paid} \mid x \text{ accidents} \right\} f_x(x) \\
&= \sum_{x=0}^{\infty} \sum_{y_1=0}^{\infty} \cdots \sum_{y_x=0}^{\infty} t^{y_1+\cdots+y_x} f_y(y_1)\, f_y(y_2) \cdots f_y(y_x)\, f_x(x) \\
&= \sum_{x=0}^{\infty} f_x(x) \left\{ \sum_{y_1=0}^{\infty} t^{y_1} f_y(y_1) \right\} \cdots \left\{ \sum_{y_x=0}^{\infty} t^{y_x} f_y(y_x) \right\} \\
&= \sum_{x=0}^{\infty} f_x(x) \left\{ g_y(t) \right\}^x \\
&= g_x \left\{ g_y(t) \right\} \qquad (4)
\end{aligned}$$

by using the definition of the p.g.f.s. Using equation (2), we then obtain the moment generating function of z as

$$m_z(t) = g_x\left\{ g_y \quad (\exp.\ (t)) \right\} \tag{5}$$

To obtain moments we differentiate (5) with respect to t at $t = 0$. Now

$$m_z'(t) = g_x'\left\{ g_y \quad (\exp.\ (t)) \right\} g_y' \quad (\exp.\ (t)) \quad \exp.\ (t) \tag{6}$$

and

$$\begin{aligned} m_z''(t) = {} & g_x''\left\{ g_y \quad (\exp.\ (t)) \right\} \left\{ g_y' \quad (\exp.\ (t)) \right\}^2 \quad \exp.\ (2t) \\ & + g_x'\left\{ g_y \quad (\exp.\ (t)) \right\} g_y'' \quad (\exp.\ (t))\ \exp.\ (2t) \\ & + g_x'\left\{ g_y \quad (\exp.\ (t)) \right\} g_y' \quad (\exp.\ (t))\ \exp.\ (t). \end{aligned} \tag{7}$$

Note that at $t = 0$, exp. $(t). = 1$. Also,

$$\begin{aligned} & g_x\ (1) = 1, \\ g_x'\ (t)_{t=1} = {} & \left\{ \frac{d}{dt} \quad m_x\ (\log\ t) \right\}_{t\,=\,1} \\ = {} & \left\{ m_x' \quad (\log\ (t)) \quad \frac{1}{t} \right\}_{t\,=\,1} \\ = {} & \text{E (x), the mean of the x distribution} \end{aligned} \tag{8}$$

and

$$\begin{aligned} g_x''\ (t)_{t=1} = {} & \left\{ \frac{d}{dt} \left[m_x' \quad (\log\ (t)) \quad \frac{1}{t} \right] \right\}_{t\,=\,1} \\ = {} & \left\{ m_x''\ (\log\ (t)) \quad \frac{1}{t^2} \quad - m_x'\ (\log\ (t)) \quad \frac{1}{t^2} \right\}_{t\,=\,1} \\ = {} & E\ (x^2) - E\ (x) \\ = {} & \sigma_x^2 + E\ (x)^2 - E\ (x), \end{aligned} \tag{9}$$

with similar expressions for the functions corresponding to y. Hence by setting $t = 0$ in (6) and (7), we obtain

$$\begin{aligned} E\ (z) = {} & g_x'\ (1)\ g_y'\ (1) \\ = {} & E\ (x)\ \ E\ (y) \end{aligned} \tag{10}$$

and

$$E\ (z^2) = g_x''\ (1)\ g_{yy}'\ (1)^2 + g_x'\ (1)\ g_y''\ (1)\ g_y'\ (1)$$

$$= \left(\sigma_x^2 + E(x)^2 - E(x) \right) E(y)^2 + E(x) \left\{ \sigma_y^2 + E(y)^2 - E(y) \right\} + E(x)\,E(y)$$

$$= \sigma_x^2 E(y)^2 + \sigma_y^2 E(x) + E(x)^2 E(y)^2 \qquad (11)$$

Therefore

$$\sigma_z^2 = E(z^2) - E(z)^2$$

$$= \sigma_x^2 E(y)^2 + \sigma_y^2 E(x) \qquad \text{Q.E.D.} \qquad (12)$$

APPENDIX 2

An Example of a Compound Distribution

A simple dice game gives an understandable example of a discrete compound distribution. If six dice are rolled, the occurrence of a "2" or "4" may be considered a loss. The amount paid is \$2 or \$4 respectively. For example, if the six dice showed 2, 5, 6, 4, 3, 3, the loss would be \$6 (\$2 + \$4). The total loss distribution is the distribution of the probabilities of various amounts of loss. The possible losses are even numbers with a minimum of \$2 and a maximum of \$24.[15]

The total loss distribution represents the compounding of a distribution of probabilities of loss and another distribution of possible amounts of loss. The probability distribution of the number of losses, $f_x(x)$, is a skewed binomial with mean equal to two ($q = \frac{1}{3}$; $p = \frac{2}{3}$; $n = 6$). $E(x) = \frac{1}{3} \times 6 = 2$. This represents the expected number of losses per roll of six dice and is equal to the loss probability times the number of exposures (dice).

The distribution of amount of loss, $f_y(y)$, is a transformed binomial with the two possible amounts, \$2 and \$4, having equal probabilities of 0.5. Its mean, $E(y)$ is equal to \$3. ($0.5 \times \$4 + 0.5 \times \$2$).

The compound distribution of total losses is:

$$f_z(z) = f_x(x) * f_y(y)$$

Its mean:

$$E(z) = E(x)E(y)$$
$$= 2 \times \$3$$
$$= \$6$$

The variance of the $f_x(x)$ distribution is:

$$\sigma_x^2 = npq$$
$$= 6 \times \tfrac{2}{3} \times \tfrac{1}{3}$$
$$= \tfrac{12}{9}$$

The variance of $f_y(y)$ is best determined by the direct method:

$$\sigma^2(y) = (-1)^2 \times 0.5 + (+1)^2 \times 0.5$$
$$= 1.0$$

The variance of the compound distribution, $f_z(x)$, by equation (12):

$$\sigma^2(z) = \sigma^2(x)\ E(y)^2 + \sigma^2(y)\ E(x)$$
$$= \tfrac{12}{9} \times 3^2 + 1 \times 2$$
$$= 12 + 2$$
$$= 14$$

The standard deviation of $f_z(z)$ is

$$\sigma(z) = \sqrt{14}$$
$$= 3.7417$$

A direct evaluation of the compound distribution can be accomplished by simple arithmetic. The first step is to develop the $f_x(x)$ distribution which is a simple binomial with $q = \frac{1}{3}$ and $p = \frac{2}{3}$. The distribution is given in Table 1.

[15] Although the technique differs, the probability distribution is the same as that of the well known barroom game of "Chairs Around the Table."

TABLE 1

DISTRIBUTION OF NUMBER OF LOSSES

x	$f_x(x)$	$f_x(x)$
0	$1 \times (2/3)^6$	64/729
1	$6 \times (2/3)^5 \times 1/3$	192/729
2	$15 \times (2/3)^4 \times (1/3)^2$	240/729
3	$20 \times (2/3)^3 \times (1/3)^3$	160/729
4	$15 \times (2/3)^2 \times (1/3)^4$	60/729
5	$6 \times (2/3) \times (1/3)^5$	12/729
6	$1 \times (1/3)^6$	1/729

In this table, the column x indicates the various possible numbers of losses. In the second column, the probabilities of each of these are calculated and expressed as fractions in the third column. The denominator is 729 in each case since the probability of loss has been expressed as ⅓. If it had been expressed as ⅔, the denominator would have been 46,656 (6^6) instead of 729 (3^6). The numerators would have been correspondingly greater, of course.

The distribution of amount of loss is a transformed binomial with the probability of a loss of $2 and of $4 each equal to 0.5 or ½. The number of losses entering into this distribution in any given case is equal to the x value (the number of losses) actually obtained in the $f_x(x)$ distribution. The probability of various numbers of $2 and $4 losses is given by the expansion of $(\frac{1}{2} + \frac{1}{2}t)^x$ in powers of t where t is a dummy variable, and the expansion must be made for each possible x from 0 to 6. The probability of a given

TABLE 2

COMPUTATION OF TOTAL LOSS PROBABILITIES FOR EACH POSSIBLE NUMBER OF LOSSES

Number of Losses x	*Probability of* x_1 *losses* $f_x(x)$	*Probability of* y_1 *$2 losses and* y_2 *$4 losses* $f_y(y_1,y_2|x)$	*Probability of loss of z dollars for given* x_1 *and* y_1 $f_z\|X = x$
0	64/729	$P_{0,0} = 1.0$	$P_0 = 64/729$
1	192/729	$P_{1,0} = 1/2$ $P_{0,1} = 1/2$	$P_2 = 192/729 \times 1/2 = 96/729$ $P_4 = 192/729 \times 1/2 = 96/729$
2	240/729	$P_{2,0} = 1/4$ $P_{1,1} = 1/2$ $P_{0,2} = 1/4$	$P_4 = 240/729 \times 1/4 = 60/729$ $P_6 = 240/729 \times 1/2 = 120/729$ $P_8 = 249/729 \times 1/4 = 60/729$
3	160/729	$P_{3,0} = 1/8$ $P_{2,1} = 3/8$ $P_{1,2} = 3/8$ $P_{0,3} = 1/8$	$P_6 = 20/729$ $P_8 = 60/729$ $P_{10} = 60/729$ $P_{12} = 20/729$
4	60/729	$P_{4,0} = 1/16$ $P_{3,1} = 4/16$ $P_{2,2} = 6/16$ $P_{1,3} = 4/16$ $P_{0,4} = 1/16$	$P_8 = 15/4 \times 729$ $P_{10} = 15/729$ $P_{12} = 45/2 \times 729$ $P_{14} = 15/729$ $P_{16} = 15/4 \times 729$
5	12/729	$P_{5,0} = 1/32$ $P_{4,1} = 5/32$ $P_{3,2} = 10/32$ $P_{2,3} = 10/32$ $P_{1,4} = 5/32$ $P_{0,5} = 1/32$	$P_{10} = 3/8 \times 729$ $P_{12} = 15/8 \times 729$ $P_{14} = 15/4 \times 729$ $P_{16} = 15/4 \times 729$ $P_{18} = 15/8 \times 729$ $P_{20} = 3/8 \times 729$
6	1/729	$P_{6,0} = 1/64$ $P_{5,1} = 6/64$ $P_{4,2} = 15/64$ $P_{3,3} = 20/64$ $P_{2,4} = 15/64$ $P_{1,5} = 6/64$ $P_{0,6} = 1/64$	$P_{12} = 1/64 \times 729$ $P_{14} = 6/64 \times 729$ $P_{16} = 15/64 \times 729$ $P_{18} = 20/64 \times 729$ $P_{20} = 15/64 \times 729$ $P_{22} = 6/64 \times 729$ $P_{24} = 1/64 \times 729$

dollar amount of total loss, given a particular x_i is then obtained by multiplying the probability of x_i losses by the probabilities of the various possible total of $2 and $4 losses in the instant case. This calculation is made in Table 2.

In the previous table the probabilities of each possible number of loss, x_i, are given in column two, as derived from Table 1. In column three, the probabilities of each possible distribution of $2 and $4 losses are computed. In the last column, the product of these two probabilities gives the probability of a loss of z dollars, on the condition that the number of losses was equal to x_i. In the case of a loss total of 0, 2 or 24 dollars, this is all there is to it. There is only one probability corresponding to each of these in the last column of Table 2. However, in all other cases, there is more than one probability for a loss of $z. Since they represent mutually exclusive ways of obtaining $z losses, they may be added to obtain the total probability of obtaining a loss of $z.

For example, there are two ways of obtaining a total loss of $4: two $2 losses with a probability of 96/729 and one $4 loss with a probability of 60/729. Hence the probability of obtaining a $4 loss in any way is the sum of these or 156/729. Performing this summation process across all the appropriate x_i s for each possible loss of $z yields the $f_z(z)$ distribution reproduced in Table 3.

TABLE 3

DISTRIBUTION OF TOTAL LOSSES, $f_{(z)}$

S_z	f_z (z) (*fraction*)	f_z(z) (*decimal*)
0	4096/46,656	0.08779
2	6144/46,656	0.13169
4	9984/46,656	0.21399
6	8960/46,656	0.19204
8	7920/46,656	0.16975
10	4824/46,656	0.10339
12	2841/46,656	0.06089
14	1206/46,656	0.02585
16	495/46,656	0.01061
18	140/46,656	0.00300
20	39/46,656	0.00084
22	6/46,656	0.00013
24	1/46,656	0.00002

PROPOSAL FOR A NEW COURSE: RISK IN THE ENTERPRISE SYSTEM

JOHN D. LONG

The thesis of this paper is that risk, per se, is a neglected subject in the collegiate curriculum and that it warrants attention in a special course organized around the phenomenon itself.[1] Some of the observations made in these pages are based on the experimentation with such a course in the School of Business at Indiana University.[2]

In presenting the following material, it is not suggested that the entire curricula in business and economics be reorganized in a framework of concepts rather than subject areas and functions—although such an idea might be worth considering. The only points being made are these: (1) judging by the frequency, complexity, and variety of the references by professors and business executives to the phenomenon of risk, this phenomenon must be crucially important to business and economics; (2) this phenomenon, though considered in many courses is not sufficiently treated in any one; (3) establishment of a special course addressed directly to risk in the enterprise system might help students (and instructors) better to understand the substance of business and economics treated in subsequent courses.

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[1] In this paper the generic term "risk" is used. Individuals who prefer terminology which distinguishes between "risk" and "uncertainty" (see section entitled "What Is Risk?") may feel that the course proposed should bear another name. The name is not sacred. The contents are more important than the title.

[2] This course was offered during the summer term of 1959 to a small group of M.B.A. candidates in a separate special section of the "Graduate Survey of Insurance." Students who participated in the course had no extensive backgrounds in the subjects studied. On the basis of this experience, a proposal is being prepared to request the Curriculum Committee of the School to authorize establishment of such a course on a continuing and independent basis. The committee has taken no position as of this writing.

Timeliness for Consideration

Perhaps consideration of the propriety of a course addressed directly to risk is peculiarly appropriate at this time. The criticism embodied in foundation reports and popular literature[3] and the resulting concerted attention being given to business and economics curricula have created a favorable climate for virtually any well-intended suggestion to be received with respect. The collective and individual efforts of the members of A.R.I.A. in curricula revision suggest an open-mindedness which perhaps is typical of that of the entire body of professors in business and economics.[4]

[3] The infamous "Ford" and "Carnegie" reports and, for example, the "popular" treatment in William Benton, "The Failure of the Business Schools," *Saturday Evening Post*, Vol. 234 (February 18, 1961), pp. 26, 73-74, 76.

[4] This refers particularly to the establishment of the "Special Committee on Curricular Concepts for Risk and Insurance."

In fact, the attention being given by A.R.I.A. to curricula revision almost demands that the phenomenon of risk be carefully appraised as to its place in curricula and pedagogy. Perhaps the name change of the organization from A.A.U.T.I. to the American Risk and Insurance Association is a case in point—particularly, since "Risk" comes before "Insurance."[5] The main danger might be in failing to recognize just how broad the phenomenon of risk may be and that the rethinking of the relationship of insurance to risk may be confined within too narrow a band on the risk spectrum.

The type of course here suggested is by no means confined to the type of "risk" treatable by insurance. Instead it embraces in elementary, yet it is hoped substantive fashion, the concept of knowledge; the significance of ignorance; the nature of scientific inquiry; the creation of risks in the enterprise system; the concept of rational behavior; risk reduction through loss prevention, statistical inference, insurance, game theory, and other devices; and reaction of a manager to irreducible risk.

"Risk in the Enterprise System"

Of course, the topics enumerated in the preceding paragraph can be embraced in the contents of other courses. In fact, many existing courses already include one or more of these topics. The suggestion here made, however, is that these and other topics are uniquely related to the broad subject of "risk" (see footnote 1) so as to fit coherently into the mold of a course like "Risk in the Enterprise System." The further possibility exists that for introductory and elementary treatment, these topics fit the "risk" mold better than they do any other. Inclusion of all of them in one course would at least have the virtue of assuring that they would not be overlooked.

At this stage there is no desire to suggest an extended syllabus for the course. Such a suggestion might be presumptuous anyway. Instead, it is thought that a repackaging and to some extent a synthesis of presently heterogeneous subject matters would suffice. The framework which is visualized would necessarily afford particular instructors considerable leeway in injecting their own concepts, emphases, and biases.

Some features which a course like "Risk in the Enterprise System" might contain are suggested in subsequent sections of this paper. A course along such lines might raise many more questions in the minds of students than it would resolve. If this condition would be the result, perhaps so much the better. The progress of understanding actually may be hastened more by the formulation of unanswered questions than by the proclaiming of stock answers.

This type of course is one that could be offered at the sophomore or early junior level, as one of the prerequisites to further work in business and economics. It is easy to visualize how it might ultimately become one of the professional "core" studies in a school of business. Perhaps the attention which many insurance teachers have necessarily given the phenomenon of risk for many years equips them particularly well to lead in the development and presentation of such a course. It should be stressed again, however, that the course, with relatively little attention to insurance, would be more of a general than a specialized offering.

What Is Risk?

One important part of the course should be addressed to the fundamental ques-

[5] See the February, 1961, letter from A.A.U.T.I. President Davis W. Gregg to active A.A.U.T.I. members, accompanying the ballot for voting on the name-change motion.

tion: What is risk?[6] It is thought that our present courses do not do justice to this generic question. In the process of seeking an answer, the instructor would have to encourage the students to attempt to answer a number of related questions including: What is the difference between knowledge and ignorance? What is "complete ignorance"—"partial ignorance"? Is risk a function of neither, either, or both? What is certainty? Is it relative or absolute? Is risk synonomous with "absence of certainty"? Is risk distinct from uncertainty? If so, how? Is risk subject to degrees? Why does ignorance exist? What is determinism—the "principle of indeterminancy"—causation—chance? What are the bases of knowledge? What are the techniques for extending knowledge? Is such extension synonomous with scientific inquiry?

A student, in seriously addressing questions like these—and the additional ones which these in turn are sure to provoke—is bound to increase his appreciation of a manager who must make decisions in the face of the unknown. Attention to questions of this sort proved very stimulating to all participants in the Indiana experiment. Perhaps some of the answers are nonexistent; perhaps others are arbitrary. Yet, each student by development of his own "system" of concepts can be armed for more efficient study in his later work. Moreover, there is enough general agreement on many points to permit an instructor to give solid help.

While pertinent literature is almost oppressively abundant for this part of the course, it might include material from the following references:

(1) Something on the bases of knowledge such as discussed in Cohen and Nagel, *Introduction to Logic and the Scientific Method*[7] or in Max Black, *Critical Thinking*.[8]

(2) Some review of the concepts of "risk and uncertainty," such as is summarized in parts of Irving Pfeffer's *Insurance and Economic Theory*.[9] Perhaps other readings from or about Frank H. Knight might emphasize that a different distinction is drawn by some authors between risk and uncertainty.[10] Other readings might be used to show that the Knight distinction is not universally regarded and that "risk" might be a generic term connoting absence of certainty in the universe.[11]

(3) Something such as found in the early part of Karl Pearson's *Grammar of*

[6] Incidentally, a special research team in the Society of C.P.C.U. is undertaking a critical re-examination of the nature and purpose of insurance. Among the subdivisions of the project is one on the nature of risk. Henry K. Duke, Insurance Consultant, Cumberland, Maryland, is chairman of the study group. Dr. Harold C. Krogh, Professor of Business Administration, University of Kansas, is Director of Research for the Society.

[7] (New York: Harcourt, Brace, and Company, Inc., 1934), Chapter X, pp. 191-198.

[8] (New York: Prentice-Hall, Inc., 1952), Chapter 13, pp. 249-270.

[9] (Homewood, Illinois: Richard D. Irwin, Inc., S. S. Huebner Foundation for Insurance Education, 1956), particularly pp. 41-42, 100-101, and 179.

[10] Perhaps from Knight, himself, Chapters I and VII, pp. 3-21, and 197-232 respectively, *Risk, Uncertainty, and Profit* (Boston and New York: Houghton Mifflin Company, 1948 reprint of the 1940 "re-issue"). Economists apparently endorsing this distinction include: Sidney Weintraub, *Price Theory* (New York: Pitman Publishing Corp., 1949), p. 352 and George J. Stigler, *The Theory of Price* (New York: Macmillan Company, 1947), p. 329. I should emphasize, however, that, at this stage, I have made no attempt to canvas and classify the literature on the manner in which risk and uncertainty are distinguished. The citations offered in this and other footnotes are not intended to be exhaustive or necessarily even the best for use in the course. I *am* suggesting that they do illustrate the point.

[11] For example, Joseph A. Schumpeter in *History of Economic Analysis* (New York: Oxford University Press, 1954), pp. 556-557 in objecting, in a footnote, to J. S. Mill's assertion that risk-bearing is an entrepreneurial function, does not make this same distinction between risk and uncertainty.

Science[12] on the nature of science and the extension of knowledge through sense impressions and their orderly classifications.

(4) A little bit about accidentalism, causation, chance, and determinism[13] and a touch of Werner von Heisenberg's "principle of uncertainty" as commented upon by P. W. Bridgman[14] and by John Dewey in *The Quest for Certainty*.[15]

(5) A brief illustration of the processes of conditional argument, chain argument, alterations, and categorical syllogisms as ways of extending knowledge through deduction. And a brief illustration of John Stuart Mills' canons of induction[16] along with recognition, at least, of the "Hume dilemma" as brought out in *An Enquiry Concerning Human Understanding*.[17]

(6) Finally, some intelligible summary of the nature of scientific investigation such as found in E. Bright Wilson, Jr., *An Introduction to Scientific Research*.[18]

This breakdown, of course, is only suggestive. It does not cover the enumerated questions in any necessary order and may not cover some at all. Still it could provide a student with a rich kit of concepts and tools for attacking the questions. Readers may be familiar with works better suited for this purpose than some or all of those listed or may have their own "pet" sources for some or all of the areas covered.

One difficulty arises in that the reading list—even in the most abbreviated form—is formidable and substantive and, furthermore, it is for only one part of the course. Much could be done, however, in the rather rapid development of appropriate text material of manageable length in the event that a course such as envisioned here did earn a place in the curricula of even a few institutions.

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[12] (London: J. M. Dent & Sons, Ltd., 1943), Chapters 1 and 2, pp. 1-68.

[13] The literature is, of course, abundant. The principal difficulty might be that of selection of good references in such a way as to stimulate but not overwhelm the student. One suggestion is that the treatments from one or a few encyclopediae be used. Pertinent references could include the following: *Encyclopaedia Britannica* (Chicago: Encyclopaedia Britannica, Inc., 1958). Vol. 1, p. 95; Vol. 5, pp. 62-65 and 219-220; Vol. 7, pp. 276A-276B (plus cross references here); and Vol. 18, pp. 529-532. (2) *Encyclopedia Americana* (New York: Americana Corporation, 1957), Vol. 1, pp. 71-72; Vol. 6, pp. 131-132 and p. 276; Vol. 9, pp. 24-25. Perhaps a few pages from John Venn, *The Logic of Chance* (2nd ed.; London: Macmillan and Company, 1876) might be helpful—for example, pp. 225-235. Allen H. Willett in *The Economic Theory of Risk and Insurance* (reprint; Philadelphia: University of Pennsylvania Press, 1951) discusses chance in Chapter 1, pp. 3-10. Of course, many logic texts have material on these points—for example, Cohen and Nagel, *op. cit.*, pp. 245-249 on causality.

[14] "The New Vision of Science," *Harper's Monthly Magazine*, Vol. 158 (March, 1929), pp. 443-451.

[15] Full title is *The Quest for Certainty: A Study of the Relation of Knowledge and Action* (New York: Minton, Balch, and Company, 1929). Pages 201-203 are particularly pertinent to the point.

[16] Presented, for example, in very readable but comprehensive fashion in Max Black, *op. cit.*, Chapters 15-16, pp. 291-333.

[17] While the essay in its entirety is pertinent to the subject in one way or another, Section IV on "Sceptical Doubts. . . ." and Section VI on "Probability" are particularly useful. This essay appears in numerous publications. See, for example, David Hume, *Enquiries* (Oxford: Clarendon Press, 1902), Section IV, pp. 25-39 and Section VI, pp. 56-59; David Hume, *Theory of Knowledge;* Editor, D. C. Yalden-Thompson (Austin: University of Texas Press, 1953) Section IV, pp. 24-39 and Section VI, pp. 57-60. Daniel Sommer Robinson, *Anthology of Modern Philosophy* (New York: Thomas Y. Crowell Co., 1931) Section III (with commentary) pp. 391-400.

[18] (New York: McGraw-Hill Book Company, Inc., 1952). Chapter 3, pp. 21-35, deals with "Elementary Scientific Method." Any one of numerous other works might be substitutable. As another suggestion, Part I "Introduction to the Logic of Science" of Karl R. Popper's *The Logic of Scientific Discovery* (New York: Basic Books, Inc., 1959), pp. 27-56, would be appropriate. This book, a translation of the 1934 Vienna edition of *Logik der Forschung*, contains as a new appendix (*xii) a letter to the author (Popper) from Alfred Einstein which illustrates scientific criticism in action and which might be interesting to students.

Relationship of Risk to Management

Another feature which should be included in this course is the connection between risk and management in the enterprise system. The point should be brought out that enterprise, in a system of capitalism, requires that individuals place themselves in the position of gaining, losing, or preserving the *status quo*, depending on the outcome of various events. Attention might be given to the question of who bears the risk, with viewpoints of Schumpeter, Hawley, Pigou, and others given recognition.[19]

The concept might be developed that business managers—by the very activity they exist to undertake—create risk. In Peter F. Drucker's writings, for example, is the objection to emphasis in management science literature on the "minimizing of risk" idea. Drucker asserts that the job of the manager is to *create* risk.[20] This concept—developed by attention to the several functional areas of business—aroused considerable interest in the experimental course at Indiana.

One way to focus attention on the relationship between risk and management is to encourage the students to recognize the problem-solving role of managers.

Herbert A. Simon goes so far as to equate management with decision making.[21] He suggests that managerial actions following a decision are resolvable into still more problems which call for choice. Other writers suggest in one way or another that managers must implement decisions and that this implementation calls for something beyond merely additional choices.[22]

In any event, the students can recognize that a good part of management is selection of alternatives in the face of the unknown. Perhaps they can even be stimulated to increase their own adeptness in recognizing and posing alternatives so as to characterize the problem sharply and to minimize the relevant range of the unknown.[23]

Somewhat extended attention should be given to the question of objectives and the nature of rational behavior. Since objectives are required to give meaning to risk (with no objectives one would be indifferent to alternatives which might have different consequences), the nature of management objectives in general and in particular might be explored.[24] Experience shows that students can wax rather eloquent on this theme.

Because rationality is supposed to guide a manager (and an individual) in choosing in an environment of risk, some of the modern thinking on this point is impera-

[19] See Schumpeter, *op. cit.;* Frederick B. Hawley, "The Risk Theory of Profit," *Quarterly Journal of Economics*, Vol. 7 (1892-93), pp. 459-479, as cited in Pfeffer, *op. cit.*, pp. 125-128; A. C. Pigou, *The Economics of Welfare* (4th ed.; London: Macmillan and Co., Ltd., 1932), Appendix 1, pp. 915-924, as cited by Pfeffer, *op. cit.*, pp. 129-130. Other economists also, of course, discuss the incidence of risk.

[20] See "Thinking Ahead: Potentials of Management Science," *Harvard Business Review*, Vol. 37 (Jan.-Feb., 1959), pp. 25-26, 28, 30, 146, 148, 150.

[21] See *The New Science of Management Decision* (New York: Harper & Brothers Publishers, 1960), pp. 1-4.

[22] See, for example, E. F. L. Brech, *Management: Its Nature and Significance* (London: Sir Isaac Pitman & Sons, Ltd., 1948), Chapter II, pp. 5-22, particularly, p. 8. Also, for several definitions see George R. Terry, *Principles of Management* (3rd ed.; Homewood, Illinois: Richard D. Irwin, Inc., 1960), pp. 24-26.

[23] Some of the intricacies of defining a problem are discussed in John D. Long, "Problem Defining—A Prelude to Problem Solving," *Annals of Society of C.P.C.U.*, Vol. 13 (Fall, 1960), pp. 97-115.

[24] See, for example, John F. Mee, "Management Philosophy for Professional Executives," *Business Horizons* (February, 1957, supplement to *Indiana Business Review*), pp. 5-11. Reprints are available. Also see Neil W. Chamberlain, *A General Theory of Economic Process* (New York: Harper & Brothers, 1955), particularly the section "A Note on Maximization," pp. 240-243.

tive.[25] Our experiment at Indiana suffered from insufficient attention to the literature on the subject of utility theory[26] and rational behavior. The question of whether or not normative human rational behavior is that of the classical "economic man," is important. Other behavioral models can be considered.[27] This sort of content for the course is important because of the light it throws on how managers should and do react to risk. Of course, some of this material might have been covered in other courses taken previously, in which case appropriate modification could be made. At the second semester sophomore or first semester junior level, however, substantial prior coverage is doubtful.

Ways of Reducing Risk

Perhaps a substantial part of the course could be devoted to ways of reducing risk. The point logically could be developed that, once business managers have created risk through enterprise, they must set about to reduce it—or at least reduce particular aspects of it.

At this point, the truly fundamental and troublesome issue could be raised as to how far management should go in attempting to remove possibly adverse consequences of events whose outcomes are not certain, when such removal is costly. The question is really one of how far to go—whatever the device—in attempting to avert a possible loss. At some point in cost, a "rational" person becomes indifferent between an attempt to reduce the risk and a resignation simply to bear it. Professor C. Arthur Williams, Jr., is among those who are pioneering in this area.[28] Since the matter of purchasing insurance is so intimately associated with this point, it is felt that members of our own discipline have a special obligation to attempt to develop more refined guidelines to this general question of how far to go in treating risk.

Whatever progress may be made on the issue outlined in the preceding paragraph, the course can grow more specific in covering ways of treating risk. Particular attention could be given profitably to the devices discussed in the subsections which follow.

Loss Prevention

This subject deserves careful treatment. As implied above, the emphasis, rather than being placed on the *ways* to prevent loss, could be placed on the question of how far to go in incurring expenses to prevent possible but not certain future losses. The question is susceptible to marginal analysis and discounting, but is probably more subtle than it might initi-

[25] One useful summary appears in Martin Shubik, "Studies and Theories of Decision Making," *Administrative Science Quarterly*, Vol. 3 (Dec., 1958), pp. 289-306 with a popular version "Economics Pattern; Six Characters in Search of an Economist," *Business Week* (Feb. 7, 1959), page 44. Also, the presentation by Robert A. Rennie at the 1960 A.A.U.T.I. annual meeting, as it bears on the relationship of risk to revenue maximization, is relevant here. See *The Journal of Insurance*, Vol. XXVIII, No. 1 (March, 1961), pp. 83-91.

[26] The classic work by Milton Friedman and L. J. Savage "The Utility Analysis of Choices Involving Risk," *Journal of Political Economy*, Vol. LVI (Aug., 1948), pp. 279-304 could be used here. Also, perhaps the material in parts of Chapter 2 "Utility Theory" of R. Duncan Luce and Howard Raiffa, *Games and Decisions* (New York: John Wiley & Sons, Inc.), pp. 12-38 might be appropriate—at least the idea of the axiomatic treatment.

[27] Herbert A. Simon's "satisficing" model might be examined critically. See "A Behavioral Model of Rational Choice" and "Rational Choice and the Structure of the Environment" Chapters 14 and 15 respectively in his *Models of Man* (New York: John Wiley & Sons, Inc., 1957), pp. 241-273. Some of the ideas expressed here might be useful.

[28] See his "Game-Theory and Insurance Consumption," *Journal of Insurance*, Vol. XXVII (Dec., 1960), pp. 47-56; also my comments on this point in "Insurance Theory: Feet of Clay?" *Annals of Society of C.P.C.U.*, Vol. 13 (Winter, 1960), pp. 231-242. In a general way, much of the Insurance Series material of the American Management Association is also pertinent to this point.

ally appear. Moreover, loss prevention activities do have psychological and social overtones.[29]

Statistical Inference

Since readers are probably rather intimately familiar with this device, little elaboration is called for here. Perhaps the point should be made that what is referred to is principally the concept of inducing (and thus narrowing the range of the unknown) through use of the normal "law of error," the central limit theorem, and the properties of the normal curve.[30] One difficulty arises in the question of whether or not statistics should be a prerequisite for the course. It is suggested that whether or not a student has completed statistics before enrollment in this course is perhaps not crucial. The essential characteristics of statistical inference—at least the idea that it is a device for reducing risk by reducing the unknown—can perhaps be grasped by a serious student who has not yet completed a statistics course. Moreover, some statistics courses may devote relatively little attention to statistical inference anyway. Hence, merely having had a statistics course is no assurance to a student that he has learned the fundamentals of statistical inference.

As a background to development of concepts in this part of the course, students should be exposed to some rudiments of probability theory. While this subheading (statistical inference) is certainly not the only one under which probability might be treated, it is thought to be a logical heading for such treatment. Experience with the course suggests that the probability coverage becomes more sparkling if seasoned with attention to the *interpretation* of probability. The mechanics of probability calculations, of course, should be covered. For example, attention could be given to the relative frequency idea, mutually exclusive occurrences, joint occurrence, disjunctive occurrence, and perhaps other aspects of the calculus of probability. A few exercises requiring the expansion of the binomial might be employed. The leavening, however, might well be provided by the basic issue of what a probability computation means in the first place.[31]

Insurance

Consideration of statistical inference, including attention to probability, leads naturally to the consideration of insurance as a device for reducing risk. In the context of this course, the emphasis should be not on types of insurance but rather on the properties of insurance as a management tool in reduction of risk. Perhaps the treatment called for here is the sort of thing which is done in many principles of insurance courses in the first week or so. Further elaboration on this device in this *Journal* might be redundant.

Game Theory

In the category of risk reduction de-

[29] The literature with which I am familiar treats this subject in somewhat cavalier fashion. Doubtless, the subject has been worked over, but I am not competent to suggest a bibliography which would provide firm axioms of behavior in this respect.

[30] The level of sophistication I have in mind is that reflected in Chapters 10 and 11 of W. Allen Wallis and Harry V. Roberts, *Statistics—A New Approach* (Glencoe, Illinois: The Free Press, 1956), pp. 309-383 or in William A. Neiswanger's *Elementary Statistical Methods* (New York: Macmillan Company, 1950), Chapter IV, pp. 95-122. Many readers undoubtedly have their own preferred source material bearing on this subject.

[31] Someone competent to use the language and notation of sets might find the approach of Samuel Goldberg effective in his *Probability—An Introduction* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1960). Others (I am included) might feel more comfortable using at the outset Chapter VIII (pp. 151-172) of Cohen and Nagel, *op. cit.* or any one of many other traditional sources. The approach in the Appendix of Pfeffer, *op. cit.* pp. 153-185, might be particularly useful in sparking thought about the interpretation of probability.

vices, game theory could very well be included. A fundamental—but not necessarily detailed—understanding of game theoretics would be highly valuable to a student in approaching his later course work. The breadth and depth of coverage need not (and in this course doubtless could not) interfere with intermediate and advanced work in game theory. There should be only enough to suggest its usefulness to a manager who has to make decisions in the absence of full knowledge about the consequences of his choices.

Perhaps the main emphasis in this phase of the instruction would be to point up the general "conflict of interests" situation and to help students see how, in given situations, some minimum level of "security" or utility can be guaranteed by judicious choice of alternatives. The maximin and minimax concepts in pure and randomized strategies perhaps could be demonstrated in two-person, zero-sum and non-zero-sum games. Even with brief attention to this approach, students can come to sense how normative game theory models can be useful to a manager in reducing the risk in certain decision contexts.[32]

Other

Perhaps attention could be given to other techniques traditionally considered under the risk reduction heading. Hedging, for example, is here regarded as a risk-reducing device for the hedger.[33] In expanding the list, care should be exercised in distinguishing between risk reduction and other ways of treating risk.

[32] Perhaps something like the first two chapters in J. D. Williams, *The Compleat Strategist* (New York: McGraw-Hill Book Company, Inc., 1954), pp. 1-85. Chapter 1, 3, and 4 of Luce and Raiffa, *op. cit.* would provide excellent coverage but might be too formidable for the purpose.

[33] But Charles O. Hardy in his classic *Risk and Risk Bearing* (Chicago: University of Chicago Press, 1923), pp. 10, 60-61, regards hedging (along with insurance) as a "transfer to specialists."

Management Decisions in a Framework of Irreducible Risk

Finally, the course should include recognition that many—perhaps the bulk—of a manager's decisions must be made in at best partial and perhaps irreducible ignorance about which of the possible outcomes will prevail and even in ignorance about the respective probabilities of possible outcomes. Worse yet, sometimes even the range of possible outcomes may not be known.

The course could make two contributions. First, it might cause students to see that risk and decision theory, while far from adequate, can shed *some* light on behavior. With a fairly small amount of reading and exercise, perhaps students can see that there are at least some "decision criteria" which may be helpful, once particular objectives are established.[34] What is suggested here is a problem situation where the consequences of a given alternative act will depend on the prevailing state of nature at the time of the choice, but where there is no knowledge, even of a probabilistic type, as to which state of nature will prevail. The main point for development could be that, once an objective is established, a manager can identify the optimal alternative act, at least in some situations.[35]

[34] Decision criteria such as presented and illustrated in Luce and Raiffa, *op. cit.*, pp. 275-286.

[35] Perhaps the concepts treated in this part of the course might bear a very close resemblance to game theoretics referred to in the previous section of the paper. The rationale for the separation here is that the former treatment (game theory) suggests courses of action to reduce the unknown, whereas the treatment here simply suggests a behavior which is "most reasonable" in the face of irreducible risk. The distinction sought is admittedly arbitrary and possibly could be dropped. The crucial point, in any case, is that attention be given both to the situation where alternative acts have two or more possible outcomes, each of which is characterized by a known or assumable *a priori* probability, and the situation where such probabilities are not known or meaningfully assumable.

The second contribution of this part of the course comes in the emphasis which could be given to the point that, despite progress in risk theory, much of the decision process still has to take place as an "art," on the basis of intuition. Examples, simple or extended, can be cited to show that because of ignorance and risk, the heart of management perhaps still cannot be "quantified," "objectified," "programmed," or "mechanized." Speculation might be opened as to future developments which might stem from the attempt of Herbert A. Simon and others to program "general" or "heuristic" problems which heretofore have not been susceptible to routinized treatment.[36] Speculation of this amazing kind might offer the proper note on which to wind up the course.

Concluding Observations

This paper has suggested that the subject of risk is not satisfactorily treated in undergraduate instruction in business and economics. Some of the concepts which might be brought together in a new course, known as "Risk in the Enterprise System" or by some other name, have been outlined in rudimentary fashion.

Five summary observations are offered in conclusion:

(1) None of the suggested contents of the proposed course is original. The novelty would come in the fact that an attempt would be made to offer subject matter like this in a single vehicle to sophomores or juniors.

(2) There is considerable room for tailoring such a course to fit peculiar situations in given institutions. Topics and emphases are subject to considerable fluctuation. It is hoped that enough of the "flavor" of such a course has been conveyed to do justice to what is regarded as the exciting potential of this approach.

(3) A working grasp of the topics suggested in this paper—and their interrelationships—would permit a student to accelerate significantly his progress in later courses. This background would also permit instructors in advanced courses to assume that the students have some familiarity with concepts which instructors otherwise would have to develop in time-consuming excursions from the principal themes. Perhaps a net increase in efficiency would be the result.

(4) The body of topics suggested would result in the course being a formidable one. The argument could be made with some propriety that the agenda is too ambitious and that anyone who purports to cover such a range of concepts, in even minimal satisfactory depth, is naïve. While this objection may be justified, more experimentation should be done. Our pilot offering at Indiana University, while different in many respects from what is suggested here, was sufficiently encouraging to leave the way open for more experimentation and perhaps ultimate establishment of a regular undergraduate offering. Experience might prove some of the suggested topics to be unworkable or ill-fitting. Some topics omitted from this paper might prove to be useful in this general framework.

(5) The variety of source material indicates readily that successful mass instruction in this approach to risk, enterprise, and management will require development of new text material. Initially, limitations on availability of reading material will keep the offering restricted to fairly small groups. If the approach has merit, however, text material need not be a prolonged bottleneck. The author knows of others, besides himself, who could be motivated to join in an effort to prepare suitable materials for sophomore or junior treatment of this complex of topics.

[36] See Simon's *The New Science of Management* as cited in footnote 21, particularly pp. 25-32.

HISTORICAL DEVELOPMENT OF SOME BASIC LIFE INSURANCE TERMINOLOGY

DAVID A. IVRY

One of the responsibilities assumed by the Editor of the Committee on Life Insurance Terminology is to conduct research on the historical development of basic life insurance terminology. This article reports some of the findings. The terms to be discussed are these: Life Insurance, Annuity, Ordinary Life Insurance, Industrial Life Insurance, Group Life Insurance, Life Insurance Agent and Life Underwriter.

Life Insurance

When did the specific term "life insurance" originate? No precise answer to this question is available. The combination of the insurance mechanism applied to the subject matter of human life appears to have evolved quite naturally over time.

It has been aptly stated that "the origins of life insurance are obscured in the mists of antiquity." Life insurance historians are in agreement that the concept of protection against loss of human life values may be traced to ancient civilizations—to ancient Babylon, Greece, Rome, and China. Some historians claim that the earliest type of insurance on lives was on slaves. These early precedents to modern life insurance were extremely crude and bear but the slightest resemblance to life insurance as currently practiced.

Life insurance in crude form existed during the Middle Ages. The Guilds had as one of their major purposes the relief of members and their families in time of distress. Burial benefits were part of the program. The Friendly Societies that followed the Guilds in England continued granting this form of protection.

By the sixteenth century, marine insurance had been firmly established in England. The insurance, of course, was written by individual underwriters. As a natural development from marine insurance, private underwriters began to issue policies insuring a ship captain against capture or death on a voyage.

Mention must be made of the most famous of early life insurance policies. On June 18, 1536, a one-year policy was issued on the life of William Gybbons. Gybbons died on May 29 of the following year. The underwriters refused to pay on the technical plea that the insured did live twelve full months, accounting at the rate of twenty-eight days to the month. The court ruled against the underwriters and enforced settlement of the claim.

In 1699, a life insurance association was founded in England known as the Society of Assurance for Widows and Orphans. The association was to be limited to 2,000 members. It was assessment in character and mutual in organization. There was selection of risks by the trus-

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tees and a written policy was issued to members. The Society lasted only a short time.

In 1706, the Amicable Society for a Perpetual Assurance Office was founded. The founding of this company marked the beginning of the end of the dominance of individual underwriting of life risks. The Amicable offered insurance for the whole of life instead of for a temporary period. However, the permanent policies did not have a fixed face value.

It may be said quite properly that modern life insurance dates from the founding of the Society for the Equitable Assurance on Lives and Survivorships in 1756 ("Old Equitable"). The company offered whole life, level premium insurance for a fixed face amount. The premiums were graded according to age at entry, and the policies were participating in nature. Policy provisions included a period of grace and reinstatement. The "Old Equitable" issued its first policies in 1762.

In 1759, the first life insurance company was formed in America. This company was organized by the Presbyterian Synods in New York and Philadelphia for the purpose of insuring the lives of their ministers. The Presbyterian Ministers' Fund issued it first policy in 1761.

Annuity

The concept of annuities goes back to Roman times, if not earlier. There is definite historical evidence that the first mortality table was used for annuity arrangements—the Ulpian Life Table, constructed by Praetorian Prefect Domitius Ulpianus. Annuities were first granted in England in the early 16th century.

The term "annuity" was used by John Dewitt in the seventeenth century. He wrote a *Treatise on Life Annuities.* The word, annuity, is clearly derived from the Latin "annus" (a year).

A definition of an annuity was set forth by Sir Edward Coke while sitting as Lord Chief Justice of the King's Bench. This event occurred in the early part of the seventeenth century. Lord Coke defined an annuity as "a yearly payment of a certain sum of money granted to another in fee for life or years, charging the person of the grantor only." This concept has persisted with some modifications and is the foundation of many definitions of our American courts.

Ordinary Life Insurance

There are few, if any, terms in life insurance terminology that are as widely criticized as *ordinary life insurance,* the major segment of the life insurance business. Certainly the term leaves much to be desired. It has a poor connotation and does not adequately describe this major branch of the life insurance business.

How did this term evolve? Surprisingly, there is little reported as to the evolution of the term. All the basic reference books on the historical development of life insurance ignore this question.

The following explanation is suggested, for which the author is indebted to Mr. Malvin Davis, Senior Vice President of the Metropolitan Life Insurance Company.

Until the advent of industrial life insurance in both England and the United States, there was no need to have a word preceding the term "life insurance." In other words, the early companies sold *life insurance.* When the Prudential of England began selling weekly premium policies for small sums, while at the same time conducting their regular business, the need developed for differentiating between these two classes of business. A similar situation occurred in the United States when, in 1879, two going organizations—the Metropolitan and the John Hancock—also entered the industrial life insurance business.

The word "ordinary" has a number of definitions in everyday usage. One definition is *usual*, and the evidence seems to indicate that it was in this sense that ordinary came to be used in life insurance. When referring to the usual type of life insurance in contrast with the new, less important segment (industrial life insurance), the term "ordinary life insurance" came into vogue. Statistics clearly reveal that industrial life insurance *always* has been significantly smaller than ordinary when measured by amount of insurance in force.

A letter from the publicity manager of the Prudential of England to the Metropolitan gives some interesting information. When the Prudential of England began writing industrial insurance in 1854, the terms used to differentiate between the two branches were "industrial assurance" and "general assurance." The term "general assurance" appeared in the minutes of the company up to 1873. In that year, managers were appointed to take charge of the industrial branch and the *ordinary branch*. This appears to be the first occasion for the use of the term "ordinary" by that company.

Group Life Insurance

It is relatively simple to research the development of this term. Although there is some historical evidence of groups of lives being covered in slave trade days and of some experimentation by a German life insurance company in group coverage in the nineteenth century, group life insurance may be said to have been born in 1911. In that year, the Equitable Life Assurance Society of the United States issued a group policy to the Pantasote Leather Company, covering 121 employees. This occurred while negotiations were proceeding for a group contract for Montgomery Ward.

The policy form in connection with the Pantasote Leather Company was filed with the New York Insurance Department under the title "Yearly Renewable Term, Employees' Policy." The policy form filed with the Illinois Insurance Department in 1912 for the Montgomery Ward case was listed as "Group Policy, Employees' Yearly Renewable Term."

The Equitable files disclose that the terms "group insurance," "group life insurance," "life insurance in groups," were used interchangeably in early discussions within the company relative to the Montgomery Ward case.

The term "group insurance" was used most frequently by the life insurance companies which early entered the business. As other forms of group coverage developed, the term "group life insurance" became standardized.

The definition of the term "group" was stabilized in 1917 when the National Association of Insurance Commissioners appointed a committee to study group life insurance and to report on acceptable standards for the business. The first standard definition was promulgated in 1918 by the N.A.I.C. and was subsequently adopted by many states. This definition has been amended several times over the years.

The term "group life insurance" is a most appropriate term for describing this segment of the life insurance business. It is a logical term within the framework of life insurance terminology.

Industrial Life Insurance

In contrast with general satisfaction for the term "group life insurance," there appears to be a great deal of dissatisfaction with the term "industrial life insurance." Certainly this term is not descriptive of a particular segment of the life insurance business. It is a term that leads to confusion both within the industry itself and with the general public.

Tracing the development of this term presents no problem. The term was

adopted in England in the nineteenth century because the primary market for this type of insurance was the English industrial worker. This form of life insurance was a concomitant of the Industrial Revolution, designed to provide some minimum protection to industrial workers. The premiums were collected weekly at the homes of policyholders, and the insurance was for small sums.

The first British industrial life insurance company was founded in 1849. The company was known as the Industrial General. It remained in business for only a short time. In 1852, the British Industry Life Assurance Company was organized to write industrial life insurance exclusively. This company was eventually taken over by the Prudential of England.

The advent of the Prudential of England into the industrial field in 1854 marked the true beginning of modern industrial life insurance. The Prudential was a reputable ordinary company. In 1854, it began issuing policies for small sums to insureds from age 10 to 60. The premiums were to be collected weekly by company representatives at the homes of policyholders. A few years later witnessed the company issuing industrial insurance on the lives of infants.

Industrial life insurance began in the United States with the incorporation of the Prudential Insurance Company of America in New Jersey in 1875 (the company was known originally as the "Prudential Friendly Society"). Four years later, the Metropolitan and the John Hancock entered the field of industrial life insurance. The Metropolitan and the John Hancock until this time had been "ordinary" companies exclusively.

Life Insurance Agent and Life Underwriter

Many terms have been used to describe the life insurance field man who contacts the public. Is "agent" the better term, or is "underwriter" more satisfactory? Certainly the Committee on Life Insurance Terminology will spend a great deal of time on this important question. This article is concerned with the historical development of these terms as they pertain to the man who sells life insurance.

The term "agent" is one that goes far back into English common law. An important branch of the law is principal-agency relationships. It was natural, therefore, to apply the term to the representative of a life insurance company who acted on behalf of his principal, the life insurance company.

The Westminster Society, organized in England in 1792, was the first life insurance company to undertake selling through an agency system. This company gave commission contracts to bankers and lawyers, allowing them to deduct 5 per cent of all the premiums they collected in the first and all succeeding years of the life of a policy.

The "Old Equitable" was firmly entrenched in the London market at this time, and the officials of the Westminster Society wisely sought business in the outside-of-London market. The practice then was to have the directors evaluate applicants, who were required to appear before them in person for observation and questioning. This practice was not feasible for the market sought by the Westminster Society. Thus, the company appointed leading citizens (bankers and lawyers) from different communities to act for the company in selecting risks. They were not active in seeking out risks to insure. Their function was to pass upon business that walked into their offices.

Historians tell us that the first agency appointment in America occurred in 1807 when Israel Whelan of Philadelphia was appointed by the Pelican Life Insurance Company of London. He was already in the insurance business, representing the Phoenix Fire Office.

In 1842, the Mutual Life of New York was incorporated, and in 1843 it began issuing policies. This company is generally acknowledged to be the pioneer American company to utilize agents for the solicitation of business. One of the major features of the second half of the nineteenth century in life insurance history is the development of the agency system.

The word "underwriter" was introduced in the second half of the nineteenth century as a synonym for "agent." The term "underwriter" goes back some time in insurance history, but in a different sense. The story is well known of individual risk-bearers in England signing their names under insurance agreements; hence, underwriting the risk. This discussion, however, concerns itself with "underwriter" as the man who markets life insurance.

The term was used long ago in connection with the formation of field associations. On June 10, 1872, the Cincinnati Association of Life *Underwriters* was formed. A man who had a profound influence on the formation of this association and others, including the National Association of Life Underwriters, was Colonel Chauncey Monroe Ransom. Colonel Ransom was a leading figure in insurance journalism. He was acutely aware of the chaotic, dog-eat-dog conditions prevailing among life insurance men, and he saw the need for self-regulation through trade associations.

Associations of life *underwriters* quickly sprang up in other areas. The early associations did not last long for a number of reasons, but they played an important role in the next era of the association movement which began in 1883 with the formation of the Boston Association. From 1886 until 1890, many associations were formed, and the term "underwriters" was used in the titles of most of these associations. A call for a national meeting was issued, and this meeting was held in Boston in June, 1890. After prolonged debate, the newly formed organization adopted the name "The National Association of Life Underwriters." The word "underwriter" is, of course, a part of the professional designation, Chartered Life *Underwriter*, which is granted by the American College of Life *Underwriters*. Thus, the term "underwriter" in the sense discussed here has broad application today within the life insurance institution.

RETALIATORY INSURANCE COMPANY TAXATION: AN EVALUATION

ROBERT S. FELTON

Most studies of retaliatory laws in insurance company taxation emphasize the legal aspects of the laws, leaving in a secondary position the evaluation of the laws from the standpoints of the insurance company and the states. Although a strong case on moral grounds can be made against the retaliatory laws, it is recommended that the present laws be preserved and that the other states enact such laws. Retaliatory legislation is one of the few methods left by which the insurance industry may protect itself against further increases in taxes levied by state and local governments.

Two forces help to keep a brake on the total taxes paid by the insurance companies: the "in lieu of" provisions and the retaliatory laws. The purpose of the "in lieu of" provisions is to keep additional types of taxes from being imposed, and the purpose of the retaliatory statutes is to restrict total dollars paid under *existing* tax statutes.

The retaliatory statutes provide as follows:

> The retaliating states say to all other states —if you tax or regulate our insurance companies in excess of the standards that we have set up for your insurance companies, we shall tax or regulate yours here by the same degree.[1]

It should be noted that the conflict is between states and not between domestic and foreign companies in the same state.[2] Given the existence of domestic companies, the effect of this type of statute is to subject the companies to retaliation in other states because the home state taxes companies from other states at a high rate. Hence, the domestic companies under retaliation bring pressure to bear on their own state to keep the foreign rates low.

This study does not dwell on the theoretical difference between retaliation and reciprocity. Rather, the study merely points out that approximately ⅛ of the 52 states (including Puerto Rico and the District of Columbia) being considered have effective retaliatory laws. One state, Wisconsin, has a reciprocal law, and the other states have neither law.

The reciprocal law in Wisconsin[3] has been virtually nullified for certain lines of business. Foreign companies pay on the basis of the taxes imposed by the laws of their home states upon Wisconsin companies rather than on the other basis. But since there is a minimum tax on fire and marine lines of ⅜ of 1 per cent of gross premiums, plus the 2 per cent fire department tax on fire lines, there is in effect a nullification of any advantage to be gained from the reciprocal provision for

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[1] Harold H. Leavey, "Retaliatory Laws in the United States Relating to Insurance," *Insurance Law Journal* (February, 1953), p. 110.

[2] Raymond Harris, The Deputy Superintendent and Chief Counsel of the New York Insurance Department recommends that the retaliatory laws be written to fulfill their true purpose of defense. According to Mr. Harris, their purpose should be to equalize the burdens between domestic and foreign companies in the same state. "Lex Talionis," *Examination of Insurance Companies*, Vol. 5 (New York: Privately Printed, 1955), p. 336.

[3] *Wisconsin Statutes* (1955), Section 76.35.

fire companies, except for the few states that have rates higher than 2% per cent. (This minimum does not apply to life, casualty, and surety lines.)

Purpose and Applicability

The purpose of the retaliatory laws is two-fold. For those states that have domestic companies, the purpose is to protect the domestic companies while operating in other states. For those states that have relatively few domestic companies operating outside their own borders, the purpose is to raise revenue.

For purposes of illustration, assume that Illinois is the home state of an insurance company. When Illinois companies operate in other states and the other states have companies operating in Illinois, the retaliatory law provides that if the other states tax Illinois companies at a higher rate than the one which Illinois applies to out of state companies, then Illinois will tax companies of the other states operating in Illinois, on the same basis as its company was taxed out of state.[4]

In the case of a state with few domestic companies operating outside its borders, the protective feature of the retaliatory law is not effective for the reason that there are no companies from that state to retaliate against in other states. In such a case a retaliatory law is used for raising revenue. If a state without domestic companies charges 2 per cent to foreign companies and a foreign company doing business in that state is from a state that charges foreign companies 4 per cent, then, other burdens being equal, that company will pay 4 per cent to the state, because of the retaliatory law, rather than the 2 per cent rate on foreign companies in the premiums tax law. Thus, more revenue is raised for the state with the retaliatory law.

Retaliatory laws are generally applicable to "similar" impositions and bases, to taxes levied on insurance companies as insurance companies, and to compulsory payments. The question of what is a similar imposition or a similar base has raised many problems.

When deciding whether or not retaliation should be invoked against a company of another state, the retaliating state must first decide if the two states have similar impositions. If the tax base is not the same, it is difficult, if not impossible, to administer effectively a retaliatory statute. For example, if one state has an ocean marine profits tax and the other state taxes the ocean marine business under the gross premiums tax, it is difficult to determine which state has the higher tax. It cannot be said that a premiums tax on ocean marine business will be a greater or lesser burden than a profits tax. In some years, some companies might be paying under the retaliatory law, and, at the same time, other companies from the same state will be paying under the premiums tax law.

If state "R" (the retaliating state) were to tax insurance companies at $25 per agent, and state "A" were to tax at the rate of 1 per cent of premiums, it could not be said that state A would tax more (or less) than state R. One agent from state R operating in state A might incur less than $25 of taxes due, while another agent might incur more than $25.

In the case of *State* v. *Continental Insurance Company*, the Indiana Supreme Court held that, because there was a different base in each state (the Indiana law provided for the deduction of losses paid within the state, whereas New York did not allow this deduction), the taxes could not be compared, because the retaliatory law demands "like for like." This decision in effect nullified the Indiana Retaliatory Law.[5]

Problems incident to an attempt to com-

[4] Mr. Harris has suggested that the title of his treatise ("Lex Talionis") can be interpreted to mean "an eye for an eye." Harris, *op. cit.*, p. 322.

[5] *State* v. *Continental Insurance Company*, 67 Indiana Appellate 536, 116 F. E. 929.

pare ocean marine profits tax with gross premiums tax, the agent's license problem, and the *Continental Insurance Company* case serve to illustrate that, in order to impose the Retaliatory Law, there must be similar impositions or bases.

The Retaliatory Law is ordinarily imposed only when a tax is levied on an insurance company as such, or in a case in which an income or franchise tax is levied on all *businesses*. That is, a sales or use tax levied on everyone alike is, with minor exception, not figured in the retaliation.

When calculating how much tax has been paid to another state, amounts paid for voluntary assessments are not included. In the *Firemans Fund Case*,[6] the company wanted to take credit for assessments made to the Boston Fire Insurance Patrol. The court ruled that this credit was not allowed since contributions for the upkeep of the Patrol were voluntary as far as the *state* was concerned.

Constitutionality

Since an interpretation of the laws is involved in the problems and questions raised here, the constitutionality of the laws is examined very briefly. Even though retaliatory laws do not violate the federal Constitution, they may violate the constitution of the state which enacts the statute.

Although the status of retaliatory laws was not specifically discussed in the *South-Eastern Underwriters Association*[7] decision, many states feared that the various state insurance tax laws would be declared discriminatory. Consequently, there were many changes in the state laws during the year following that decision. Kastner, in the American Life Convention Annual Report for 1945, stated that 19 states took steps to equalize rates during the year, and 14 states repealed their retaliatory tax laws.[8] However, after the McCarran Act and the *Benjamin* Decision in South Carolina, the issue of discrimination was no longer raised, and most retaliatory tax laws were definitely considered not to violate state constitutions.[9] In at least one state, however, the law has been declared unconstitutional because of that particular state's constitution. According to McCombs:

> In 1931 the Supreme Court of Alabama held that Section 8363 of the 1923 Alabama Code was unconstitutional. Section 825 of Title 51 is similar and perhaps identical with the 1923 statute and hence is unconstitutional. Opinion of the attorney-general, Oct.-Dec., 1943, p. 18.[10]

Although the Indiana Retaliatory Law has not been declared unconstitutional, it has in effect been nullified because Indiana is the only state that allows the deduction of losses paid within the state when gross premiums are being figured. This imposition is not similar to the impositions of other states.

Significant Components of the Laws

There are four important provisions to be considered in a retaliatory law: permissive versus mandatory enforcement, aggregate versus item-by-item calculation, provision for local taxes, and inclusion of security fund taxes.

[6] *Firemans Fund Insurance Company* v. *Commissioner of Corporation and Taxation*, 325 Massachusetts 386, 90 N.E. 2d 668.

[7] *United States* v. *South-Eastern Underwriters Association et al.*, 322 U.S. 533.

[8] "Kastner Talks on Premium Tax Situation," *Eastern Underwriter* XLV 5 (November 9, 1945), p. 4.

[9] Although the subject of retaliation was not specifically covered in the act and case, the McCarran Act provided for state taxation, and the *Benjamin* Case upheld the validity of the McCarran Act. *Prudential Life Insurance* v. *Benjamin*, 328 U.S. 408 (1946). U.S. Code T 15 Sections 1012, 1013.

[10] *Insurance Law Index Service* (Jenkintown, Pennsylvania: McCombs and Company), p. Ala. 57.

Permissive versus Mandatory Enforcement

Colorado is an example of a state having a permissive rather than a mandatory retaliatory law. This is accomplished through the words

> . . . the same taxes and fees in the aggregate, fines, penalties, deposits, examination, obligations, and requirements *may be imposed* by the commissioner upon all insurers doing business in this state. . . .[11]

The more common method is the mandatory enforcement, as exemplified by the retaliatory law in the state of Illinois. This law states:

> . . . and all such companies, . . . *shall be required* to make deposits, pay penalties, fees, charges and taxes, in amounts equal to those required in the aggregate for like purposes of Illinois companies doing business in such state. . . .[12]

It is important for the retaliatory law to be on a mandatory rather than on a permissive basis if the law is to be effective in holding down taxes.

Aggregate versus Item-by-Item Computation

The second important part of a retaliatory law is the method of computation. This part has been subjected to court interpretation many times. In the *Hobbs* Case, although the statute involved did not use the terms "aggregate" or "total," it was held that the aggregate of all Kansas taxes must be compared with the aggregate taxes in the other states to determine if retaliation was in order.[13]

While most states use the aggregate approach, Utah is an exception. In Utah, retaliation is imposed when taxes in larger amounts *or* at higher rates are imposed by the foreign state.[14]

Although some retaliatory laws actually specify "aggregate," attempts have been made to impose the laws on an item-by-item basis. In one state, retaliation was imposed against fees and then credit was given under the *total* taxes. The net effect on the insurance companies of this approach was that the companies did not have to pay any more than if the total amount had been aggregated. Apparently the reason for this departure was that the insurance department received its funds from the fees, and the retaliatory taxes went into the general fund of the state.

The problem of aggregate versus item-by-item computation is not always clearly defined. The Texas retaliatory law poses a problem of interpretation. The provision states:

> . . . taxes, licenses, fees, fines, penalties, deposit requirements or other obligations, prohibitions or restrictions are imposed . . . which, in the aggregate are in excess of the aggregate of taxes, licenses, fees, fines, penalties, deposit requirements or other obligations, prohibitions or restrictions. . . .[15]

Here it is difficult to see how the "taxes and other obligations, prohibitions or restrictions" can be aggregated. The purpose of the aggregate computation is to come up with a total *dollar* amount which is then compared with the total dollar amounts under the requirements of the other state. But non-monetary requirements cannot be added with dollar amounts.

Occasionally a problem arises in interpretation, even when the law specifically specifies aggregate computation. Illinois had a problem of this type in 1958, in which the interpretation of the words "in the aggregate for like purposes" was subject to dispute.[16] The insurance de-

[11] *Colorado Revised Statutes* (1953), Section 71-1-14 (2) (emphasis supplied).

[12] *Illinois Revised Statutes* (1955), Chapter 73, Section 444 (emphasis supplied).

[13] *Employers Casualty Company* v. *Hobbs*, 149 Kansas 774; 89 P. 2d 923 (1939).

[14] *Insurance Law Index Service* (Jenkintown, Pennsylvania: McCombs & Company), P. Utah —57.

[15] *Vernon's Texas Statutes* (1947), Article 21.46, Insurance Code.

[16] *Insurance Company of North America* v. *Gerber*. (apparently not reported)

partment, imposing the tax, stressed the words "for like purposes" and tended to ignore the word "aggregate." The original purpose of the words "for like purposes" was to exclude from retaliatory computation taxes such as *ad valorem* taxes and other general taxes unrelated to the insurance business. The court decided that the word "aggregate" is the dominating consideration and not "for like purposes." With reference to the practical problems of aggregating impositions, the court went on to say, "the argument that it is administratively difficult of application appears to be more imaginative than real."

Provision for Local Taxes

The provision for local taxes is not so involved as is the computation. Some retaliatory laws, such as the law of Oklahoma, specifically refer to local taxes in the retaliatory law. The Oklahoma statute provides:

> . . . any tax, license, or other obligation imposed by any city, county, or other political subdivision of a state or foreign country on Oklahoma insurers or their agents shall be deemed to be imposed by such state or foreign country within the meaning of this section.[17]

Other retaliatory statutes do not specifically refer to local impositions. It is to the advantage of the insurance company to have specific reference to political subdivisions in the retaliatory law, since this reference helps to keep down the total amount of taxes.[18]

Sometimes local taxes are credits against the state taxes; in such cases the local taxes do not add to the burden.[19] Nevertheless, the problem of allocation to the taxing districts can prove very costly to the insurance companies.

In 1951 Nebraska changed its method of taxing fire insurance companies in its various political subdivisions. Prior to this time the subdivision taxed the companies as it saw fit, with some rates running as high as 13 per cent. Because of retaliatory pressures put on the domestic companies operating in other states, the insurance industry was successful in convincing the legislators to levy a flat 2 per cent rate on foreign companies. According to the *National Underwriter:*

> The bill was favored by several of the domestic fire companies, which wished to be relieved of a high retaliatory tax. It met with opposition from some domestic companies doing business only in Nebraska, and from the local governments. . . .[20]

According to a study made in 1958, there are several reasons why retaliation on municipal taxes and fees presents unusual problems:

> (1) The municipal taxes and fees in a state do not constitute a simple, specific over-all tax levy, like a state tax at 2 per cent, but can be a multitude of exactions, differing in rate or amount by community, county, parish or district.
>
> (2) Such levies can be upon the company, directly upon the agent of the company, or upon both.

[17] *Oklahoma Statutes* (1951) Section 628.

[18] In the Coleman (*Life and Casualty Company* v. *Coleman*, 233 Kentucky 350, 25 S.W. 2d 748, 1930) and Pink (*John Hancock Mutual Life* v. *Pink*, 276 N.Y. 421, 12 N.E. 2d 529, 1938) Cases, it was decided that local taxes are to be taken into consideration when figuring retaliation. In the *Pink* Case, "the precise question was whether a municipal tax levied upon Corporation X by city in State R (New York City) was a tax imposed by law of State R. The court held that since the municipal tax was imposed by authority of a state enabling act, it was a tax imposed by State R, and, hence, Corporation X should be permitted to take credit for that tax when computing the difference it owed." John W. Fishbach, Chairman (1951) and C. Merritt Lane, Chairman (1956) "Report of Subcommittee on Retaliatory Law" (New York: Life Insurance Association of America, 1956), p. 18. Privately printed.

[19] This is the case in Florida, where insurers do not actually pay the municipal tax but submit a report showing the allocation to the municipalities. It is then up to the state to distribute the funds from the premiums tax. *Florida Statutes* (1957), Section 185.08.

[20] "Nebraska Bill Would Revise Insurance Taxation Basis," *National Underwriter*, LV (April 19, 1951), p. 13.

(3) Such levies can be by almost any municipal division of the state such as city, village, town, county or parish and in one isolated instance, by a school district.

(4) The question of the legality of retaliation against such municipal levies under the normal retaliatory law.

(5) The difficulty of obtaining accurate information for use as a basis of retaliation.

(6) Normal human reluctance of state department personnel to undertake difficult added burdens of administration when most departments are even now understaffed.

(7) Normal apprehension on the part of domestic company personnel that such retaliation, even if legal, may provoke reprisals and antagonisms.[21]

The Raynoha study points out that Virginia has solved the first problem (that of computation) to a certain extent:

> . . . Virginia obtains the aggregate payments from its companies for municipal levies and such other states in the direct premiums written therein and then obtains the percentage ratio thereof. This percentage rate (*sic*) is then imposed as an added retaliatory levy upon the companies doing business in Virginia domiciled in states which have municipal levies. We noted Virginia establishes two separate ratios for each such state, one being for life and the other for fire and casualty.[22]

Harold Leavey commented on this practice in reference to the states of Connecticut, Maryland, and New Jersey where, "the practice has been criticized as not being precisely accurate and being arbitrary, but it does seem to be practical."[23] Until a better way is found, this is probably the better method.

Security Funds

Security fund taxes are levied not for purposes of a tax but for the benefit of policyholders and hence are in effect trust funds rather than impositions on the insurance companies.[24] In spite of this characteristic of the taxes, it is to the benefit of the insurance industry to include these funds in the retaliatory computation. If they are not included in the retaliatory computation, there is less reason for the domestic insurance companies operating outside the borders of their states to bring pressure to have these taxes reduced or prevent them from being imposed.

Administration

Generally speaking, the only taxes subject to retaliation are those imposed either by insurance codes or on insurance companies as such. In a recent case referred to above, one of the questions was the inclusion of the Illinois Net Receipts Tax.[25] The Net Receipts Tax is a personal property tax and as such it has been claimed that it should not be subject to retaliation. But it was decided that:

> In my judgment, the net receipts taxes should be included in determining the applicability of the statute. It is certainly a tax and is imposed by insurance code in lieu of personal property taxes with the rate and amount of tax regulated by the revenue code.[26]

The fact that this tax is imposed by the insurance code and that the tax base is described in terms of insurance premiums leaves no doubt that this is an insurance tax and hence subject to retaliation.

Sometimes insurance companies are required to calculate taxes both on the tax basis of their home state and on the basis of the state in which they are filing the return, and pay whichever is higher. In some states, however, it is up to the insur-

[21] Martin F. Raynoha, Chairman, "Report of the Special Study Committee of the Problem of Retaliatory Taxation on Municipal Taxes and Fees to the Deputies, Actuaries and Chief Examiners of Zone IV, N.A.I.C." (1958), p. 6, Privately Printed.

[22] *Ibid.*, p. 15.

[23] Leavey, *op. cit.*, p. 113.

[24] Security Funds, for example in New York, are created for the purpose of insuring the payment of benefits under policies affected, in the event of the insolvency of any company issuing such policies.

[25] *Insurance Company of North America* v. *Gerber.*

[26] *Ibid.*

ance department to decide whether to invoke retaliation; sometimes the department figures the taxes. Since the companies have a vital interest in the taxes, it is to their advantage to compute the taxes for their own purposes, whether they are required to do so or not. Certainly they want to make calculations for both states if they receive a bill from the retaliating state saying that they owe more because of retaliation. Individual states want to make calculations for both states for the same reasons. Again, however, the problem arises in that it sometimes is not clear just what companies pay taxes under retaliation and what companies do not.

Some states allow alien companies to choose where they shall be deemed to be domiciled for purposes of retaliation. An example of the retaliatory law of the state of Florida before it was changed in 1958 and the present retaliatory law may illustrate the problem that can arise. The old law provided:

> . . . For the purpose of this section, an alien insurer shall be deemed to be domiciled in a state designated by it wherein it has, (a) established its principal office or agency in the United States, or (b) maintains the largest amount of its assets held in trust or on deposit for the security of its policyholders and creditors in the United States, or (c) in which it was admitted to do business in the United States; provided, that in the case of an insurance company incorporated in Canada, the domicile shall be deemed to be in Canada. . . .[27]

The new retaliatory law covers the matter in a different way:

> . . . For the purposes of this section the domicile of an alien insurer, other than an insurer formed under the laws of Canada or a province thereof, shall be that state designated by the insurer in writing filed with the commissioner at time of admission to this state or within six (6) months after the effective date of this code, which ever date is the later, and may be any of the following states . . .[28]

The "following states" referred to in the new code are the same as in the old code. The important difference to note here is that, under the new law, a company must designate when it is admitted to the state, what its state of domicile shall be. This requirement in effect minimizes the possibility of escaping retaliation.

One other problem which illustrates the complexity of interpretation is worthy of note. In the case of *Employer's Casualty Company* v. *Hobbs*,[29] a Texas company had over 50 per cent of its assets invested in Texas securities and hence was entitled to be taxed at the rate of .625 per cent instead of 3.25 per cent. Kansas retaliated against this company by charging it 3.25 per cent because this was the higher of the rates of the two states. The insurance company asserted that the rate should be .625 per cent on the Kansas premiums because the company should be taxed on its Texas basis. However, the court ruled that the company was to pay at 3.25 per cent—the important question being how a company from Kansas operating in Texas would be taxed.

Benefits

Insurance Industry

It was stated previously that the two purposes of retaliatory laws are to protect domestic companies and to raise revenue for the states. If the protection of the domestic companies is to be achieved by having the insurance companies (of the states being retaliated against) put pressure on their legislatures to keep down foreign rates in that state, then the assumption must be made that domestic companies are politically powerful.

Granting the assumptions that the do-

[27] *Florida Statutes* (1955) Section 626.061.

[28] *Florida Statutes* (1959), Section 624.0228.

[29] *Employer's Casualty Company* v. *Hobbs*, 149 Kansas 774; 89 P. 2d 923 (1939).

mestic companies are politically powerful, retaliatory laws help the insurance industry in that the application of the laws acts as a brake on taxes. This brake is well illustrated by something that happened in the Illinois legislature in 1959.

At that time Illinois had a foreign rate of 2 per cent and was contemplating raising the rate to 4 per cent. The purpose was to raise tax revenue for Illinois. Interested parties in the insurance industry calculated the effect of the retaliatory laws of other states against Illinois companies if the higher 4 per cent rate were to be passed. The insurance companies domiciled in Illinois and operating in other states would be retaliated against because Illinois would then have a tax rate higher than the other states. The figures showed that, for every additional dollar taken in by the state of Illinois, the companies that were domiciled in Illinois and operated in other states would pay out an additional $10 to *other* states. The demonstration of this fact to the legislature was instrumental in keeping the tax rate from being raised to 4 per cent.

States

The benefits of retaliatory laws do not all accrue to the insurance industry. Certainly the states are direct beneficiaries of the retaliatory statutes—at least in the short run. Whether a retaliatory law is passed for the protection of domestic companies or for revenue, a state is still in a position to take in more money when it imposes retaliation.

Disadvantages

Retaliatory laws give real advantages to both the states and the insurance companies, but their application is not without disadvantages also.

If taxes are paid on a retaliatory basis, they are not always passed through in the rate structure. If State A imposes a greater tax burden on foreign companies, and a company of State A is operating in State B where the tax burden on foreign companies is lower, the company of State A pays the higher tax in State B. When the rate filings are made in State B, the rate cannot include enough for taxes paid on the retaliatory basis, because there may be companies from almost every other state operating in State B which do not pay the higher tax because their states do not charge a greater amount to foreign companies. Therefore, it is only the companies of State A that must pay the higher taxes. Apparently, taxes paid under retaliation are not included in the rate because the commissioner in State B cannot be concerned about what happens in other states; that is, he is not concerned with the fact that State A taxes foreign companies at a higher rate. Another reason why retaliatory taxes are not included in the rates is that the rate filings do not assume *all* companies will pay on a retaliatory basis for the same risk.

Another serious disadvantage to retaliatory statutes is that more taxes may have to be paid in the short run. An example should illustrate this point. Assume that State A has a 4 per cent rate on foreign insurance companies while State B has a 2 per cent rate. Also, assume that State B does not have a retaliatory law. Then a company domiciled in State A and operating in State B would pay a 2 per cent tax on premiums written in State B. But if State B should pass a retaliatory law, then the company domiciled in State A would have to pay (other burdens being equal) 4 per cent on the premiums written in State B.

One rather serious objection on the part of states to retaliatory laws is that they allow other states to control domestic affairs of the home state. Since the retaliatory laws apply to other obligations in addition to taxes, there is a certain amount of "control from without." The advantage to the insurance companies of having the

statutes act as a brake on taxes, is a disadvantage to the states. That is, less taxes are paid in the long-run period. Apparently the states are not as much concerned about this situation as they are about the disadvantages mentioned immediately above. As far as can be determined, this is because the legislators making the laws are more concerned about what is happening now and less about what will happen in future years. Such a conclusion indicates that the application of the law is independent of fiscal or equitable considerations.

Breakdown of Efficacy

Under some circumstances, the efficacy of the retaliatory laws fails as a brake on taxes. When there are few domestic companies operating outside the borders of the home state, there are few companies subject to retaliation in other states, and hence less pressure is put on the legislature in the home state to hold down the taxes on foreign companies.

There may be valid reasons (for example, in the case of security funds) for the exemptions of these funds from retaliation. However, if the states are to be prevented from imposing more taxes for security funds in the future, it seems that the funds must be subject to retaliation. This fact has been recognized in that the retaliatory laws now being passed do not exempt security fund taxes unless "heretofore imposed."

It is doubtful whether the application of the retaliatory laws is effective in preventing the imposition of local taxes. That is, a small political sub-division of a state has too much to gain through the imposition of taxes, to be influenced by insurance companies of its home state (and probably not even domiciled in that particular political sub-division).

In cases where a situation develops that was not contemplated when the retaliatory law was first passed, it is often desirable to have reciprocity agreements between commissioners of states. This can be done in a state where the retaliatory law is on a permissive basis rather than a mandatory basis. But reciprocity concerning mandatory burdens tends to weaken the effectiveness of the laws.[30]

It is very unusual for a taxing statute to be written specifically to exempt insurance companies from retaliation. This has been done in one case, The Philadelphia School Tax. Other businesses than insurance companies pay this tax, but specific reference is made to insurance companies:

> ". . . 'Business' shall not include the following: . . . the business of any insurance company . . . doing business in such other states are subjected, by reason of the tax imposed by this act, to additional or further taxes . . . by such other state. . . ." [31]

The efficacy of the retaliatory laws would be greatly hindered if this type of statute were to spread. On the face of the matter, it looks as if there were exemption from the tax for insurance companies, but this is not always the case. There is no exemption to companies domiciled in states that do not have retaliatory laws, nor in states where the laws are not enforced, nor in states such as Indiana and Alabama, where the laws have been nullified or declared unconstitutional. Any time an analysis such as that above is made involving retaliation by another state, the assumption is made that there are other states with lesser tax burdens. If all states but two (other burdens being equal) had a 2 per cent rate on premiums, while the remaining two states had a 1 per cent rate, and if one of the two remaining states were to raise its rates to 2 per cent, then companies of that state would be subject to retaliatory pressures in only

[30] California's present retaliatory law is mandatory for taxes but permissive for other impositions.

[31] *Purdon's Pennsylvania Statutes* PL 265, No. 45, Section 1: 1956, February 10, PL (1955) 1014, Section 1.

one state (the remaining state with the one per cent rate). This means as more and more states raise their rates to a common level, there is less and less retaliation.

Although it is to the advantage of ocean marine insurers to be taxed on a profit basis in order to compete with insurance companies of other countries, it would not be to the tax advantage of the insurance industry as a whole to have more lines of business on a profit basis. If more lines were on a profit basis, then, as illustrated above, these lines could not be included in the application of the retaliatory laws. The fewer the number of lines of business subject to retaliation, the less effective are the laws, unless all lines should go to some other *common* basis.

Another breakdown of the effectiveness of the retaliatory laws would result in a case such as was contested in Delaware in 1956.[32] Here certain casualty lines of business were taxed to provide funds for policemen's pensions. The statutes providing for the tax stated:

> ". . . No insurance company affected by provisions of this section shall increase the rate of insurance premiums upon any insurable risk affected by this section because of a tax provided for in this section." [33]

The idea was to have the tax paid directly by the policyholder so it would not be a cause of retaliation. In this case, even though the insurance company technically is not paying the tax, the tax is still directly related to the insurance premiums; thus, as far as the insuring public is concerned, it increases the cost of insurance.

In Mississippi, credit is given to domestic companies for taxes paid under retaliation to other states. This negates the whole idea of the retaliatory protective features because domestic companies are not being retaliated against in other states; and hence do not try to get the foreign tax reduced in their home states.

When the tax is calculated on an item-by-item basis rather than an aggregate basis, the total taxes paid are usually higher than if they are paid on an aggregate basis. For example, if State A charges $50 for a filing fee and State B charges $25 for a license fee, then State B, when retaliating against companies in State A, charges both the $50 filing fee and the $25 license fee. Under the aggregate method the amount would be (other burdens being equal) $50 rather than $75.

Raymond Harris points out that some states, New Jersey, for example, apparently try to avoid retaliation by imposing a licensing fee on the agent for the privilege of representing an insurer in the capacity of an insurance agent.[34] The rationale for this is that a tax on a company is subject to retaliation; a tax on the agent may or may not be subject to retaliation.

In conclusion, it should be re-emphasized that the most effective way for the insurance industry to prevent higher taxes in the long run is to have retaliatory laws in all states. In those states where there are no such laws now, it would be to the advantage of the insurance industry to encourage the passing of these laws. This, of course, would mean that the insurance industry would pay more taxes in the short run but the safeguard of having the retaliatory law in all the states would be well worth this small price.

[32] *Aetna Casualty and Surety et al.* v. *Harry S. Smith* (information from Plaintiff's Brief).

[33] *Delaware Code Annotated* (1953) Section 2711.

[34] Harris, *op. cit.*, pp. 330-331.

THE IMPACT OF AUTOMATION ON INSURANCE EDUCATION AND MANAGEMENT

JOHN R. FONSECA

Insurance companies soon will have a more vital concern in the education of their future management officers. This interest has roots in the present trend towards and need for more and faster electronic data processing equipment in home and branch offices of insurance companies.

Data processing refers to the taking of many and varied facts, applying them according to a predetermined formula, and then arriving at more useful facts in a standardized form. This is elementary when used to describe bookkeeping or accounting. But when automatic and electronic machines are used, the elements of time and mass are reduced to millionths of a second so that the results become qualitative in their effect on management.

This form of computer equipment is becoming a necessity in the competitive market. Most large insurance companies already have millions of dollars invested in such equipment, either through rental or purchase. Electronic data processing (EDP), or automation, is creating an impact on the hiring and training of personnel at almost every level in the insurance industry. The extent of this impact and its probable effect on college students create a challenge for college administrators and teachers.

This concern is presently at the stage of articulation as witnessed by this statement by R. K. Mueller, Vice President of the American Management Association:

> Congress is probing it, Harvard is assessing it, the British Parliament is considering it, cartoonists are lampooning it. Labor feels bound to criticize it, possibly out of failure to understand it, while management wonders, "Hadn't we better do something about it?" Authors term it a "major technological revolution," "evolution, not revolution," "the new horizon," or "the cliché of the year".[1]

Even the Russians are doing something about it: they have already set up a new Ministry for Automation. This is not to suggest that a similar solution would be appropriate in this country.

The major concerns that the insurance industry is and will be facing are in two main areas:

(1) the tools: known as the hardware, these are the large, expensive and complex machines that process the data and furnish management with increasingly accurate and detailed reports, statistics and prime analytic information.

(2) the men: a) the engineers who,

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In 1959, the author was awarded a grant by the American Association of University Teachers of Insurance to study the impact of automation on insurance education. Subsequent research and findings, however, have resulted in the selection of a broader topic, with insurance management included in the research area.

[1] *Keeping Pace with Automation* (American Management Association, Special Report No. 7, New York, 1956, p. 5).

although primarily a problem for the hardware producers, still are necessary to service the data processing equipment once it is installed in the company; b) the programmers and systems and methods people who must know the total operations of the company in order to establish selective plans for using the hardware in an insurance company; c) the officers who must coordinate the use of hardware and the programmers. At this level automation will have its greatest effect. It is these men who will decide what hardware to use, what the company will do with it, and then, even more important, what decisions are to be made based on information received.

It is at this level that the university must prepare the future insurance executive, be he of mid-management or top-management status. The most important concern is the effect on management. This is the most challenging yet least explored aspect of this new field of automation. How is management to deal with it? At present, the companies which are becoming aware of the problem are looking to the colleges.

It is apparent that management's role will be one of larger scope, of more knowledge and understanding, of more integrated concepts. A new curriculum will be required. But what kind? Various suggestions, broad though they be, are being made in educational institutions such as the Columbia Graduate School of Business, Carnegie Institute of Technology, and the University of Chicago Graduate School of Business. Some specific techniques are proposed, such as the Harvard Business School case method. Here the courses formerly limited to marketing, accounting and finance were changed so that the focus is now on the process of management decision-making in the business world.

But Carnegie honestly admits it does not know how the business man's job will be different in 1980. The same admission was made by Dean Wallis of the University of Chicago when he wrote:

> What will the leaders in business need to know in the next millennium? If we know anything about the answer to this question, it is that nobody knows anything about the answer.

Yet, most educators seem to agree that the university should teach the basic underlying fields of knowledge in the practice of business. Specifically, these basic fields are: economics, quantitative methods (accounting, statistics, mathematics), behavioral sciences (psychology, sociology, anthropology), and law.

Yet, is this really a basic change? Are these curricula a set of old courses with new names? Are these curricula but a broadening of the present courses plus a few "liberal arts" courses? Are these curricula merely a shift in emphasis away from "tool" courses?

Will educators become so inundated by such massive technical information that they begin to concentrate on the survey, and forget that the problem is made up of components with which men must deal by means of their own limited abilities? Do they revert to "basics" because the basics are only those which university personnel continue to know because the tangle and mountain of data, information and knowledge is beyond the possible comprehension of any one professor?

The problem is not simple. The answer is not simple. Yet it must be made. It must be made by the university, for the university has an obligation to define the problem and to act, not arbitrarily, not irrevocably, but to continue to redefine, to explore new possible solutions, and to experiment. It must do this before external pressures are put on it, before impatient forces assail it, before the problem becomes acute, for otherwise it will act in haste and later will repent.

The business world has been and still is quite patient with the university. Although at times it belittles certain results and calls for a better product, it knows whence comes its hope. It is to the university that leaders in all forms of business look for guidance and help.

While on a leave of absence to the Wharton School of Finance and Commerce of the University of Pennsylvania, the author mailed a questionnaire dealing with this topic to some 1600 insurance companies, colleges and insurance professors. Although the number of responses was less than 300, those who replied contributed excellent ideas and thoughts.

The questionnaire had two main questions and a general request for opinions on the main research topic. This report summarizes the more important responses, replies that represented the general thoughts on the subject and commentary that evidenced keen awareness of the problem.

Probable Management Changes

Question 1—If you believe that electronic data processing and other forms of automation by insurance companies will cause substantial changes in insurance company management and sales, please comment, briefly or at length, on what these changes will be, or already are.

One important pattern of replies dealt with the total operation of an insurance company and the need to coordinate the various functions of each department. The following are representative responses:

> Since computers tie in the overall systems area, management must possess a more comprehensive scope of operations. It must assist in the adaptation of these equipments to the decision-making areas. The sales areas can be relieved of much of the burden of the necessary paperwork in performing their function.
>
> Much of the detail necessary to the general management of business can be taken over by machines, freeing the managers to spend more time in the planning areas.

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> EDP requires greater understanding of the total operation of an insurance company and the inter-relationships of various functions.
>
> In sales, EDP makes possible more rapid and sound decisions on coverage changes, pricing, placement and staffing of sales force, etc. Followed to its logical conclusion by a number of companies, this means intensified competition, elimination of marginal companies and producers, and a better break for the public in price and service.
>
> Under present methods, it is practical to divide functions and charge individual departments with planning, scheduling and performing functions. Under Electronic Data Processing, it is necessary to combine functions, many of which are now done by different departments. Therefore, there will be a need for reorganization and for more overall planning and scheduling to take full advantage of the capability of electronic machines.
>
> There will probably be a shift to more emphasis on research and statistical analyses to test the operational philosophies of the company since electronic computers are capable of simulating model company operations under various assumed conditions.
>
> The possible changes in sales will be an increase in emphasis on specialized plans of insurance to fit more closely particular needs of segments of the population. The large calculating capacity of the electronic computers will make it possible to develop premiums, values, and other necessary material for the development and maintenance of more complex forms. This trend will bring about a more diversified line of policies.

• • • • •

> 1. Management is going to need to understand the kinds of information needed and to understand what is being fed into data processing channels.
> 2. Management is going to need to understand what it has when it receives the information from the data processing channels.
> 3. Management is going to need to know how to coordinate the various facets of its program that will present them-

selves in the new type of organization which will be made possible through the abundance of information that will be made available through data processing methods.

4. Decision making is to become a more important function; management must learn how to use the abundance of information at its disposal in the decision-making process.

The main line of commentary on this specific point concerns the integration that electronic data processing will facilitate. The following results are desired: "rapid and sound decisions," "better break for the public in price and service," "freeing the managers to spend more time in the planning areas."

The understanding of interrelations of departments by management, and their organization, not in a line but almost in a staff relation, are important changes that are to be expected and need to be anticipated. The importance of this development as it relates to education for management is apparent but the kind of education needed has yet to be defined. Will the manager have to know more or less about each individual department? Will he have to know about specifics in the total operation? More important, however, is the question—"What do we want the manager to know"? The questions need not be posed in mutually exclusive terms, for a manager can know more specifics and still know more generalities.

Several respondents stated that another contribution by EDP will be more and better data. However, they point out that this will not replace the experience and judgment of management. What is important is the elimination of guesswork, faulty data or useless facts.

Some comments on this point follow:

> We will no longer be flying by the seat of our pants; we will know where we have been, where we are going, how we will get there—and we will know today—not six weeks or months after the events happened.
>
> We will have new and important statistical information—profitability of line, class, policy, type, producer, service office, etc.—this information will permit us to take quick action to correct our weak spots.
>
> The company will take over most of the detail, leaving the producer to do the job he knows best (?), sales.
>
> • • • • •
>
> I believe that management will be very much affected. Management will have more tools, better data. There will be less of the obscure judgments based upon the executive's experience (not that this will be eliminated, however).
>
> In the life insurance business, major company decisions come only after adequate statistical study (which may not already have been done on the point in question) and elaborate experimenting with various combinations of premium components with policy benefits. Through these efforts a decision can be reached as to the proper combination of interest, mortality, loading and policy guarantees to assure reasonable, long-term safety of the product for the company and a satisfactory competitive position. EDP will speed up these approaches to decision, making the product marketable earlier and permitting earlier correction of adverse influences, but its effect beyond that is rather obscure.

It is appropriate to consider at this stage whether judgment is a result which is achieved at the end of a great number of data placed in some sort of sequence. Webster defines judgment as:

> The mental act of judging; the operation of the mind, involving comparison and discrimination, by which knowledge of values and relations is mentally formulated. (Webster's *New Collegiate Dictionary*)

This question is posed not to minimize the importance of the speed and accuracy that EDP furnishes for the decision or judgment, but rather to point out the difficulty in assuming that more and better data necessarily result in more

and better decisions. Probably better decisions or judgments will be attained with more and better data but EDP will not *ipso facto* produce better judgments.

Representative of this attitude is the statement by a Canadian respondent:

> If, by the utilization of EDP, more and better information can be made available to assist management in making its important decisions, then this should represent a substantial change insofar as management is concerned.
>
> In that regard management must know what information it requires but which is not presently available to it.

Negative features were pointed out by only a very few respondents. Representative of this minority is the following:

> Automation, if used in a large insurance operation, will undoubtedly create greater efficiency in routine processes, and should produce expense savings in the form of greater production with no increase in man hours. But there will be a corresponding loss in personal service and, possibly, an estrangement of the policyholder.

To another small minority, the only advantage of EDP was an economy and efficiency in the bookkeeping department.

> Non-complex lines in property and casualty, such as personal property insurance (homeowners and auto), will soon be entirely machine written and billed from company offices. This includes all companies operating on the American Agency System. Probably, all AAS company agents will soon be remitting balances on remaining types of business on the basis of company prepared accounts.

Proposed Curriculum Changes

Question No. 2 read: In view of the increased need and use of electronic data processing in the insurance industry, do you think that colleges must *reappraise* and *change* their insurance and business curriculum? If so, what should these changes seek to accomplish for the student and the industry?

Most of the responses concerned themselves with "liberal education," "liberal arts," or "broad background."

It is enlightening to note that executives in the insurance industry desire to have their management, present and future, come to them with all good things possible. Some of the respondents equate the so-called "liberal arts" with such characteristics as "wide perspective," "well-rounded educational and social background," and the like. Whether this is an actual belief in the wondrous marvels of the liberal arts program and how it creates the "well-rounded" manager or whether it is the fashion today to denounce subjects and courses which specialize, is somewhat difficult to ascertain.

What kind of a man is the insurance executive? More important, what kind will he be in five years, 10 and 50 years from now? What part will automation play in the make-up of the future executive? What can the college do to prepare him? For college can at best give this future executive only the first stage of his many-stage learning process.

A college is more than a place for solitary self-examination and acquisition of knowledge. A good executive draws on many experiences and facts. This was behind the thinking of many of the respondents when they spoke of the centrality of liberal arts, and of the practical needs of specialization, such as the following:

> The underlying fields of knowledge—courses in economics, accounting, statistics, mathematics, the behavioral sciences, logic, the scientific method, etc., will still be necessary to prepare the student broadly for maximum effectiveness. . . . He still needs a wide perspective if he is to assess correctly the broader implications of his work. . . .
>
> • • • • •
>
> Change should be made so that student learns that which industry is not equipped to teach him. More knowledge of the why and the effect on all the various elements involved.
>
> • • • • •

I believe colleges should reappraise and change their curricula to produce the type of generalists and specialists needed in this rapidly changing age. The colleges and the industry could probably work together to survey the type of job opportunities that will be available in the future.

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We lean to the view that the best college training for insurance executives leads to a liberal arts degree, without vocational courses. Where vocational training is involved, either as a graduate or as an undergraduate, the objective should be the furnishing of general foundation, background and habits, not detailed operational training, which will come on the job.

One company executive wrote that "colleges must *lead* instead of follow business, by at least 10 to 20 years." This, of course, highlights the main purpose of college—it is to prepare the man for life, not just for now, but for 10, 20 and more years in the future. This calls for continued cooperation and exchange between the educator and the employer.

A disturbing comment was submitted by a professor of insurance. He was concerned with the contradiction between facts and theory in the selection of executive material.

I do not see the need for reappraising and changing the insurance and business curriculum because of electronic data processing. As a matter of fact, the insurance company executives do not agree on what type of training they would like the colleges to give prospective insurance employees. My own contacts with insurance executives lead me to believe that presidents and executives in the highest echelon favor a liberal education as a background for their future employees.

Many of them express preference for Arts and Science graduates rather than School of Business graduates. Many of them would prefer to teach the insurance needed for their own company by their own training programs. At the lower level, however, recruiters and general agents, prefer to have some insurance background or at least some general business training.

Is this an example of lack of communication within the organization, is it a lack of understanding of the needs of the company, or is it the way a difficult problem is being handled in a short-sighted manner?

Colleges and business are both parts of our society. Their ideas and ideals are similar in many instances; their needs are dependent—the college draws on business for much of its factual matter, business seeks its continuity and advancement from colleges. Neither can afford to be solitary and aloof in its particular endeavor.

Yet, many times neither sees the worth of the other. Much has been done in recent years to cross lines in an honest effort to gain and help. The problems of the present and future will do much to bring the classroom into the company and the company to the campus. The greatest rewards will go to those colleges and insurance companies which do this the earliest and in the best manner.

Impact of Automation on Education

Question No. 3—"Your ideas and counsel regarding insurance company automation and the impact on insurance education are solicited and will be greatly appreciated"—was an open-end type question. What was sought here were responses that would bring attitudes, thinking and imagination to bear on the problem.

Some of the comments were significant, but, unfortunately, there were not too many. Perhaps many respondents felt that they had already submitted sufficient commentaries in answer to the two prior questions.

Most of the comments dealt with the need of the college graduate to be able to think, analyze and be creative. But surely this was also something sought by Plato and by all colleges at all times. Perhaps, however, thinking, analysis and imagina-

tion are more needed today than ever before.

Here are a number of representative answers in this vein:

> We think that the purpose of education is to develop the student's capacity to define problems and make constructive decisions. Education, in this sense, is distinguished from training, which involves the developing of particular operational aptitudes and skills. Training is, of course, important for operating personnel, but we think that the job of the colleges is education, as distinct from training.
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> After thirty-seven years in the insurance business and actively engaged in every phase, my principal gripe is the lack of ability or interest of the majority (including the college graduate) to think logically and to apply what they have learned to some unfamiliar area. . . . Insurance company automation will require even more imagination and application of logical thinking.
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> • • • • •
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> Educators should disabuse students' minds of the thought, so prevalent in popular literature, that automation reduces the need for thinking or planning on the part of management. Because of the high costs involved and the inflexibility of an automated system, it is probably more important than ever before that management people must be able to provide the long range viewpoint and the decisions which are so often beyond the reach of the technicians actually designing or installing an automated system.
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> • • • • •
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> The machine cannot replace the attributes that a successful business will always need. Rapid changes in business organization and administration will require creativity, adaptability, and imagination.
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> • • • • •
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> Automation means more study and greater understanding. Automation is not going to do the job of thinking—the student must learn to do that both before and after data are fed to the machines.

The "paper problem" can be met only by more automation, according to one executive. In solving it, companies will need more qualified people; with this will result an increase in salary and more status. The following extended comment is quite apt:

> Insurance companies are notoriously bogged down with literally tons of paper work and record files. The expensiveness and often shoddy handling of this clerical routine work acts as a disservice to the insuring public, in view of the solution to the problem through EDP. The insurance industry (companies and agents) should make an all-out effort to extend automation. More automation will require better-educated, more highly-qualified personnel who can then be afforded because of savings through mechanization. Insurance education will then become a more highly-respected field when effective (dollar) demand increases for the insurance-educated college graduate.
>
> Insurance companies must first install the systems; educators cannot assist very well in this task. The educators may be helpful in an advisory capacity in improving the systems. EDP systems can then be taught in the classroom.

A word of caution came in this form:

> Company automation is greatly overrated and the substitution of a computer for an employee with a typewriter and calculator does not change the basic principles required to conduct the business of an insurance company.

Sales people felt that automation would have an impact on their operations. However, they differed as to the degree. Some were gloomy as to the prospects for "better people" until incomes could be made more attractive. On the other hand, automation is considered by some sales executives to be an adjunct to their operation.

> One of the greatest needs today is for colleges and universities to do a much better job of impressing their students with the importance of sales in the business world, and in insurance in particular. Machines will not take over this most important area in the foreseeable future and this is what keeps business going. Automation is still only a service to the sales force.

Too many times Electronic Data Processing is magnified to the extent that it appears to be the only solution to current insurance problems. "Just give me the right machine and we'll solve that underwriting problem, find out why we have such a high loss ratio and . . ." But, surely it will not be so. Not even the inhabitants of the *Brave New World* were completely satisfied, and they were not only mechanized, they were machine-made!

So this caution, cast in a poetic statement, is a good note to strike as an ending:

> All management of business of any size should be well enough versed in EDP that it does not become a form of latter-day magic performed by the High Priests of the Little Black Box.

DOES A DEDUCTIBLE CURB MORAL HAZARD?

RICHARD F. SCHMIDT

Few contentions are as firmly established in contemporary insurance thought as the one which holds that a deductible provision in an automobile insurance policy serves as a major safeguard against moral hazard. This article seeks to analyze the validity of this position.

Webster defines moral hazard as "the hazard arising from the uncertainty of the honesty of the insured." [1] Anyone familiar with insurance will recognize the inadequacy of this definition. A chronic alcoholic may be honest, but every automobile underwriter in the country will consider him a potential moral hazard. An actuary defined moral hazard thus: ". . . moral hazard . . . embraces the intangible human frailties and propensities which cannot be measured by any rating system and which cannot be accounted for in advance by a requisite premium charge." [2] Another well-known writer attempted to clarify the concept by distinguishing between moral hazard (the propensity of the insured to help consciously or otherwise to increase the chance of loss) and morale hazard (the relaxation of normal precautions that results from insurance protection).[3]

It is probably safe to continue using the established phrase as long as one clearly understands all of its connotations. Briefly, the term moral hazard, as used here, refers to an insurance company's increased chance of loss resulting from an individual insured's tendency to deviate from generally accepted standards with respect to: (1) competence, (2) reputation, (3) carefulness, (4) propensity to submit fraudulent claims, (5) zealousness in the pursuit of legitimate small claims.

Which of these several hazards, collectively known as moral hazard, can be treated effectively by the deductible method?

Lack of Competence

It is immediately apparent that a deductible in an automobile insurance policy does nothing to improve the insured's competence in handling his car.

Poor Reputation

A deductible provision obviously does not improve one's reputation and cannot mitigate this aspect of moral hazard.

Lack of Care

Many of the beneficial effects imputed to the deductible, as a safeguard against moral hazard, are thought to flow from the incentive to greater precaution engendered in the insured by the knowledge that he must bear part of any loss. "Compulsory participation serves an educa-

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[1] *Webster's New International Dictionary of the English Language.* Second edition, unabridged (Springfield, Mass., G. C. Merriam Company, 1942), p. 1592.

[2] Stellwagen, H. P. "Automobile Insurance," *The Annals,* The American Academy of Political and Social Science. Vol. CXXX (March, 1927), p. 154.

[3] Kulp, C. A. *Casualty Insurance,* Third edition (New York, The Ronald Press Company, 1956), pp. 11-12.

tional function," wrote a Swiss author, "it strengthens the insured's feeling of responsibility and teaches him care in the maintenance and use of his automobile. In his striving to avoid small losses he frequently avoids major damage as well."[4] Like the proposition that heavy objects fall faster than light ones, this idea appeals to common sense. Unlike the Aristotelian concept of gravity, the deductible's beneficial influence upon carelessness is not easily subjected to experimental verification. To "prove" the proposition, one must advance statistics comparing the number of accidents (not claims) per car covered by full insurance with the number of accidents per car covered under a deductible form. To the knowledge of this writer, such statistics are not available. The next best approach consists of meeting the assertion on its own grounds, by an appeal to "common sense."

The case in favor of including the deductible in automobile insurance policies to reduce the frequency of accidents rests upon the validity of two points: (1) Caution reduces the number of accidents, and (2) Awareness of the financial consequences of loss promotes caution. There seems to be little argument or evidence to cause one to question the fact that driving care reduces the number of accidents. The second point raised above deserves careful consideration. Does awareness of possible financial loss resulting from an automobile accident improve driving care? If it does, then the converse must hold true as well. To reduce the unprofitability of careless driving through, for instance, insuring the financial consequences of carelessness, would diminish driving care and increase the number of accidents.

In automobile liability insurance, this point is by no means settled, as can be seen from the diametrically conflicting opinions held by responsible writers on the subject. One author maintains that

> the principal cause of automobile accidents today is the type of automobile insurance now being sold in the country. . . . For a small premium (the driver can) transfer practically all financial responsibility to a professional insurer for his acts. . . . The driver . . . has no incentive to be a good driver. (To reduce accidents) we must make it financially unprofitable for the individual driver to drive unsafe equipment or to drive carelessly.[5]

On the other hand, a different writer concluded that

> as to the individual private passenger owner and operator, there is probably no connection whatever between the possession of insurance and his actions as a driver.[6]

Which of these views is correct? A look at the experience of the only state in this country in which compulsory liability insurance has been in effect long enough to yield significant data, may provide the answer.

Massachusetts introduced compulsory third party bodily injury liability insurance in 1926, at a time when fully 75 per cent of all drivers carried no such coverage. It is probably true that those who did carry insurance possessed above average wealth and above average awareness of the financial calamity that might befall them if their negligence resulted in verdicts being rendered against them (jury awards were running to five-figure amounts even in those days). But it would be unrealistic to consider the remaining three-quarters of the driving population as being impoverished, habitually irre-

[4] Martolini, Silvio. *Die Autokasko-Versicherung in Theorie und Praxis.* Volkswirtschaftstheoretische Abhandlungen herausgegeben von M. R. Weyermann. Weinfelden, A. G. Neuenschwander'sche Verlagsbuchhandlung. 1930. p. 210.

[5] Oppenheimer, Robert H. "Insured to Kill: The Influence of Automobile Insurance on Accident Frequency," *Readings in Property and Casualty Insurance.* Chapter 51. H. Wayne Snider, editor (Homewood, Illinois: Richard D. Irwin, Inc., 1959), pp. 475-476.

[6] Kulp, C. A., *op. cit.*, p. 208.

sponsible, or entirely unaware of the danger to their financial position that might result from a judgment in a liability case.

How, then, was the state's accident record affected by the removal of the first $5,000 of potential bodily injury liability for 75 per cent of the state's motorists? Compulsory insurance not only "had no measurable effect on the occurrence of accidents," [7] but the most recent study of this question by Liberty Mutual, covering the years 1934-1949, showed that Massachusetts has had a more favorable trend in fatality rates—the most reliable index—than the rest of the country.[8] Based upon these studies, it is concluded that a deductible will not improve driver safety if it is included in a liability policy.

There is still the question of the effectiveness of a deductible in preventing accidents when it is included in a collision insurance policy. In the absence of the statistics referred to earlier, the answer depends upon whether or not the threat of a bodily injury claim resulting from an accident looms as large in the driver's mind as the threat of financial loss resulting from damage to his own automobile. There is no definite answer, but one may seriously question whether the incentive to safe driving engendered by the knowledge that one shares the first $50 or $100 of every loss resulting from damage to one's own car, can be very significant if the elimination of the first $5,000 of third party bodily injury liability for three-quarters of the driving population in one of our most industrialized states, failed to result in a relative increase in the number of accidents due to all causes, including carelessness. At best, the issue remains debatable.

Propensity to Submit Fraudulent Claims

Exaggerating the Size of Losses

The propensity to exaggerate the size of actual losses receives its impetus from two distinct motives, the "pure profit" motive and the "full indemnification" motive. In the absence of a deductible, only the first of these, the "pure profit" motive, comes into play by furnishing incentive to reap "profits" in the form of indemnification payments exceeding the actual loss suffered. Adding a deductible does not eliminate this motive but does make it more difficult to realize, since a claim must be exaggerated by at least the amount of the deductible before the first dollar of "profit" can accrue. On the other hand, the deductible introduces a far more powerful incentive to claim-size exaggeration, by goading the insured into claiming indemnification for the full amount of his loss, even though under the deductible cover he should bear a portion of the loss himself. The question of whether a fraud is stimulated by the "pure profit" motive as distinguished from the "full indemnification" motive may appear academic from the insurance company's point of view. But as far as the insured is concerned, the first represents actual enrichment at the company's expense—a notion reprehensible to at least some citizens—while the motive of seeking indemnification for what has actually been lost collides with fewer scruples of the average insured. The deductible thus aggravates this aspect of the moral hazard.

Falsifying the Existence or the Nature of Losses

The three types of claims which fall under this heading are: claims based upon non-existent losses; claims based upon

[7] Blanchard, R. H. *Automobile Insurance and the Traffic Problem.* Institute of Traffic Engineers. New York. 1939.

[8] Cited Kulp, C. A., *op. cit.*, p. 207. The original source of this quotation, according to Kulp, is Farm Bureau Companies, *Financial Responsibility for Automobile Accidents.* Columbus, Ohio. No dates.

losses excluded from coverage under the terms of the policy, and claims based upon willful destruction of property to create loss or to aggravate existing loss.

An insurer's best protection against these three moral hazards lies in thorough claim investigation to determine the actual existence and the true nature of the loss. The deductible provides auxiliary protection to the insurer in two ways. (1) To the degree to which a deductible eliminates small claims from coverage, it also eliminates small fraudulent claims. It thus acts primarily as a check upon small claims, but also as a check upon moral hazard. (2) To the degree to which a deductible counteracts a company's laxness in claim investigation, it acts primarily as a control of investigating expenses and also as a check upon moral hazard.

The over-all effectiveness of the deductible as a weapon against fraudulent claims depends upon the degree to which its tendency to create moral hazard in the area of claim-size exaggeration is offset by its tendency to deter fraudulent claims based on nonexistent loss, excluded loss, or willfully created loss. It is impossible to determine the degree to which these two effects counterbalance each other. The best that can be said is that the deductible's beneficial effect upon this aspect of moral hazard remains an unsettled question.

Overzealous Pursuit of Legitimate Small Claims

The discussion now turns to the final "ingredient" in moral hazard, the one aspect of the hazard which has nothing whatever to do with morals or morality. This aspect of the hazard deals with the propensity of some insureds to seek reimbursement for every $5 or $10 loss caused by their own negligence or by the negligence of third parties. Such behavior represents a distinct deviation from the generally accepted norm, since most people are satisfied to absorb such expense-type losses themselves, if only to save the time and trouble involved in filing claims. Its effect is to increase the chance of loss to the insurer; it is one of the

> intangible human . . . propensities which cannot be measured by any rating system and which cannot be accounted for in advance by a requisite premium charge,[9]

without, one must add, exposing oneself to vicious adverse selection. Such behavior represents moral hazard in every sense of the definition, even though many writers include it in their discussion of moral hazard only peripherally, if at all.

Since small losses occur more frequently than large losses, the deductible mitigates this aspect of moral hazard by reducing the opportunities for overzealous pursuit of legitimate small claims.

Conclusion

How valid, then, is the contention, so unceasingly echoed in the insurance literature, that the deductible serves as a major weapon against moral hazard in automobile insurance? The deductible does nothing to improve driver competence; it has no effect upon reputation; it is problematic whether it improves driving care and questionable whether or not it reduces fraudulent claims. There remains only the undisputed effectiveness of the deductible in curbing overzealous pursuit of legitimate small claims. It is upon this basis alone that a solid case for the deductible as a safeguard against moral hazard in automobile insurance must rest.

[9] See footnote 2.

COMMUNICATIONS

Comments on "The Challenge of Aging to Insurance" by Wilbur J. Cohen*

Attitude of Insurance Industry

Although Professor Cohen (now Assistant Secretary of Health, Education, and Welfare) gives the insurance industry credit for cooperation from 1939 to 1945 in shaping the social security system, he says, "since 1945, the insurance industry has followed the policy of opposing most major social insurance improvements." It is more accurate to say that the insurance industry has opposed those expansions of the social security system in amount or kind of benefits which it considers as not in conformity with the sole purpose of a social insurance system; i.e., the provision of a basic layer of protection against want and destitution. In the view of the insurance industry, such expansion has not represented an "improvement."

He then says that such "tactics have served to identify in the minds of many persons, that the insurance industry is 'arrogant' in its power, and monopolistic and antisocial in effect." He proceeds to warn that "the only alternative may be Federal controls over private insurance policies to assure that private insurance operates in the public interest."

Professor Cohen's remarks reflect an attitude that any opposing view is automatically one which is "antisocial." As to governmental controls, the insurance industry, as a quasi-public institution, has been carefully regulated for decades by close state supervision. Under this supervision and control it has been virtually impossible for the insurance industry to misrepresent the nature of its promises. In contrast, the Social Security Administration, in statements of OASDI officials and publications, has for years been presenting to the public an inaccurate and incomplete picture of the nature of social security rights, taxes and benefits. Congress should provide for an independent check of all statements and publications of the single-voiced "monopolistic" Social Security Administration.

"Arrogant" Assumptions

Professor Cohen, referring to a statement in my reply to the discussion at the Society of Actuaries of my paper entitled "Misconceptions and Missing Perceptions of our Social Security System (Actuarial Anesthesia)," says:

> All insurance planning, private and public, is "arrogant" by Mr. Peterson's assumption, because it attempts to commit future generations to pay out of their production for persons who are not currently productive (the sick, disabled, aged, etc.). Insurance is a mechanism which uses the present to commit the future to care for human needs.

It is not clear to me what Professor Cohen assumed my "assumption" to be, but I was thinking of arrogant assumptions in the same sense that Elmer F. Wollenberg was in his paper, "Vested Rights in Social-Security Benefits,"[1] where he wrote:

* See *The Journal of Insurance*, Volume XXVII, No. 4 (December, 1960).

[1] Wollenberg, Elmer F., "Vested Rights in Social-Security Benefits," *Oregon Law Review*, Vol. XXXVII, 1957-8, pp. 299-360, at p. 359.

> A system of contractual social insurance involves the arrogant assumption that ours is the wisest generation of Americans for some time to come. If we have the legal power to tell generations yet unborn how the national income shall be distributed in some indefinite future, we shall have to be very clever in the way we assert that prerogative.

Let us first examine the relationship of social insurance promises and their financial support. Probably no other legislative enactment commits future generations to greater obligations than our Social Security Act. Since the financing of the system is now on virtually a "pay-as-you-go" basis, (See my comments in the June, 1961 issue of this *Journal* re: Dr. Dickinson's paper.) the statutory promises of benefits to be delivered 25, 50 and 75 years hence depend for their fulfillment almost entirely upon the social security taxes that workers and their employers will be able and willing to pay 25, 50 and 75 years from now.

Although the projections by Chief Actuary R. J. Myers of future operations of OASDI under the *present law* indicate that there may be some support from interest earnings on future trust funds, a realistic appraisal of the dynamics of the system and of the political behavior in the last decade leads to the conclusion that social security taxes will *never* be much more than the amounts needed for current benefit payments and may even be less. This must be accepted as a future fact of our national life. Unless Congress exercises its right in Section 1104 of the Act to "alter, amend, or repeal any provision" of the Act, present promises and the more liberal ones which Professor Cohen advocates must be met by taxes on payrolls of the future—a massive commitment with *only* the taxing power to support it.

Now, let us look at the nature of commitments made in the field of private insurance—the only field, incidentally, where the word "insurance," standing alone, is properly used. For this purpose, private insurance promises may be put in two classes. One is where the promise of coverage is limited to short periods of time, such as one to five years, rates are fixed only for such periods and the *contract makes clear* that coverage ceases upon the expiry of the term involved unless the contract is appropriately renewed. There is little or no reserve accumulation necessary—it is "pay-as-you-go" financing, but with a clear understanding that when one stops paying, the coverage ceases and no promises are made for which there is no corresponding premium.

Contracts of the other class—permanent life insurance and lifetime annuity contracts—involve a reserve accumulation to assure the payment of benefits after premiums or annuity considerations cease. The premiums or annuity considerations must be large enough to build these reserves, and in making such payments, the policyholder, by *foregoing current consumption, is storing present wealth for future delivery.* Funds are invested in productive enterprise which thus produce the *added* national income needed to provide the benefits promised. The policyholder secures a *legitimate* claim on future productivity by foregoing consumption currently. The insurance company actuary surely must act with the highest sense of responsibility in making certain that no promises are made which cannot be supported by the established premiums or annuity considerations.

To paraphrase a sentence of Professor Cohen's

> *Social insurance* (as embodied in present and proposed legislation) is a mechanism which commits the *future* to care for *present* human needs; *private insurance* is a

mechanism which commits the *present* to care for its *future* human needs.

Social insurance *can* involve arrogant assumptions as to what future generations are able and willing to pay; private insurance, *by its very nature, cannot* involve arrogant assumptions as to its capacity to meet future promises of benefits. (This isn't to say that actuaries have had a perfect record in the past in matching premiums or annuity considerations and benefits!)

I have been discussing so far genuine insurance and annuity contracts. As to employee retirement plans, it is possible and even probable that promises or expectations are being made which will not be matched by current and future capacity or willingness to pay. The group or individual deferred annuity contract is the only form of pension funding vehicle that does match promises and contributions with certainty. In the case of collectively funded plans, such as those using deposit administration contracts and trusteed funds, there is some uncertainty as to whether there will be an adequate source of funds to meet pension expectations. Where there is great pressure on the current generation of financial officers to show a profit, there may be a great temptation to pass on to future managements some of the funding necessities. Where this is true, there may exist an arrogant assumption as to the future willingness and capacity to meet the expectations.

In the extreme case of "pay-as-you-go" financing, pension expectations under an employee pension plan are entirely dependent upon the future willingness and capacity of the employer to pay. Note the example of the United Mine Workers' plan. Despite warnings of actuaries at the time the plan was established, those responsible for shaping the plan and its financing claimed a superior knowledge as to the future success of the cents per ton financing and the productivity of the coal industry. What has happened? It has been necessary to cut pensions 50 per cent for one class of miners and 25 per cent for another class. What better example of "arrogant assumptions" can one find?

In the case of pension plans for municipal, state and federal employees, there is the same sound reason for current taxpayers to pay full funding costs as there is for the current generation of stockholders of a business corporation to pay fully for employee pension costs during the working years of such employees. At all levels of government, there is a great political temptation to rely too much on the sovereign power of government to collect sufficient taxes *in the future* to meet pension costs. Here, again, one may encounter arrogant assumptions as to future willingness and capacity to pay, and it could be particularly dangerous, since the pension rights of governmental employees frequently are contractual rights. Too much reliance can be placed upon the "full faith and credit" of Government.

Actuarial Anesthesia

When Professor Cohen says that he is "not as pessimistic as those who are worried about the anesthesia of the past or present," he seems to be admitting that there is and has been a state of anesthesia in these matters.

I am beginning to wonder if the most disturbing aspect of "actuarial anesthesia" is that the cost of social security programs is not in the general budget. Representatives of the Kennedy administration, including the President, seem to take great satisfaction and comfort from the fact that the costs of Social Security Amendments are not in the general budget. Such costs are quickly brushed aside as not affecting the general budget, nor, by implication, the economic and

fiscal health of the nation. The principle of self-support by payroll taxes is too blindly worshiped.

The Federal Government watches carefully the balance of the general budget where mainly *short-term* commitments are made. In contrast, social security expansion involves massive tax and benefit commitments reaching *forever* into the future. For example, under the Administration's medical care bill, the present worth of benefits promised to present OASDI members is probably about $25 billion greater than the future added taxes payable with respect to such members—a permanent social security debt added to the present one of about $300 billion, on which interest must be paid forever in the form of payroll taxes with respect to new OASDI members.

Furthermore, a vital part of social security anesthesia is the failure, at least by the prudent public, to recognize that with respect to any social security amendment which increases benefits in kind or amount for present members of the system, *the vast majority of those benefiting (constituting the voting power at any time) will pay only a small fraction of the cost of such additional benefits.* The remainder of the cost must be met by taxes paid by employers and by *future* entrants to the system. Labor spokesmen frequently say that the employee is willing to pay the necessary payroll tax. Why shouldn't he be willing?

The following table shows the relation of employee payroll taxes to present OASI benefit costs for entry ages 40 and 50 (which are reasonably representative of

CONSTANT TAX RATE REQUIREMENT FOR PRESENT OASI BENEFITS*

(Retirement at Age 68)

Level Monthly Earnings	*S*	*M-0*	*M-1*	*M-2*	*M-3*
			Entry Age 40		
$100	6.68%	13.36%	13.40%	13.57%	14.17%
200	5.54	10.83	10.85	10.94	11.29
300	4.45	8.71	8.72	8.79	9.10
400	3.92	7.67	7.68	7.74	8.02
			Entry Age 50		
$100	9.96%	20.32%	20.32%	20.32%	20.32%
200	8.27	14.95	14.95	14.95	14.95
300	7.22	13.12	13.12	13.12	13.12
400	6.17	11.23	11.23	11.23	11.23

RATIO OF CONSTANT TAX RATE CORRESPONDING TO EMPLOYEE TAXES IN PRESENT LAW (4.00%)** TO ABOVE OASI CONSTANT TAX RATE REQUIREMENT

			Entry Age 40		
$100	61%	31%	31%	30%	29%
200	74	38	38	37	36
300	92	47	47	47	45
400	104	53	53	53	51
			Entry Age 50		
$100	41%	20%	20%	20%	20%
200	49	27	27	27	27
300	57	31	31	31	31
400	66	36	36	36	36

* Analysis of Benefits OASDI Program 1960 Amendments, *Actuarial Study No. 50*, U. S. Department of Health, Education, and Welfare, Social Security Administration, Division of the Actuary, pp. 51-54.

** 21st Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance Trust Fund and the Federal Disability Insurance Trust Fund, p. 31.

Legend: Read the column headings as— S = Single male
M-0 = Married male, no children
M-1 = Married male, 1 child
M-2 = Married male, 2 children
M-3 = Married male, 3 children

the average age at which the present working force would become covered by *added* benefits enacted currently) and hence indicates what part of the cost of such added benefits would be covered by employee future taxes. Active workers over age 50 would pay only a tiny fraction of the cost and those already receiving benefits at the time of an increase would obviously enjoy a free hand-out.

The other side of the coin is the tax rate requirement for new entrants. Here is the status for new entrants as indicated for a male entering the labor force at age 20.

CONSTANT TAX RATE REQUIREMENT*

Level Monthly Earnings	*Entry Age 20*				
	S	*M-0*	*M-1*	*M-2*	*M-3*
$100	3.40%	6.88%	7.53%	7.88%	8.43%
200	2.42	4.89	5.35	5.68	6.12
300	1.99	4.06	4.45	4.77	5.17
400	1.81	3.68	4.03	4.29	4.63
RATIO OF EMPLOYEE TAXES TO TAX RATE REQUIREMENT					
$100	120%	59%	54%	52%	49%
200	169	84	76	72	67
300	206	101	92	86	79
400	226	111	101	95	88

* *Actuarial Study No. 50*, pp. 51–54.

The foregoing percentages should be doubled to secure *combined employee-employer tax relationship*. Thus, for new male employees with average earnings of $300 a month and entering the labor force at age 20, combined employee-employer taxes are 412 per cent to 158 per cent of the constant tax rate requirement for their benefits. At the $400 level, the range is from 452 per cent to 176 per cent. In order to maintain the system on a self-supporting basis, this relationship must apply to *all* new entrants in the future.

If Congressman Curtis' "contracting out" amendment, H.R. 4817, were enacted and generally availed of by new entrants to the labor force, it is evident that social security financing would be bankrupt!

I am grateful to Professor Cohen for giving me this opportunity to make these comments. In his present position of high responsibility in the Government he will have the opportunity to assure that a complete and accurate image of the social security system is presented to the public. In advocating changes in the system, I hope he will not take undue advantage of the unique characteristics of social insurance described in these words by Elmer F. Wollenberg:

> A social-insurance system can make some financial gambles on the future that private life-insurance companies, with their contractual obligations, would not dare to attempt. *Congress can take such chances* on the future, not only because title II has the taxing power of the Federal government directly behind it, but also *because benefit rates can be trimmed if the need should arise.*[2] (emphasis added)

As a matter of fact, the necessary and virtually complete reliance on future unknown taxing power applied to future unknown economic capacity to support social insurance promises requires even *more caution* in making social security promises than in making private insurance promises, lest some future Congress be faced with the very distasteful task of a major reduction in benefits—the kind of problem which recently *did* face the Belgian Government and which President

[2] Wollenberg, Elmer F. *Op. cit.*, p. 334.

de Gaulle in France also had to grapple with in his austerity program.

RAY M. PETERSON, *Vice President and Associate Actuary, The Equitable Life Assurance Society, New York City*

Author's Reply

In the first section of his comments, "Attitude of Insurance Industry," Mr. Peterson disagrees with my statement that the insurance industry has opposed "most social insurance improvements." He contends that the industry has opposed only those expansions of social insurance which go beyond "a basic layer of protection against want and destitution." I wish for the sake of the American people that this was so. I need not even approach the question of what constitutes "basic protection" in a dynamic economy like ours, to refute his statement. I need only point to the strenuous opposition that the insurance industry put up for several years against the addition of disability insurance protection to the program, and to its present opposition to health insurance coverage for the aged under the program.

Insuring the worker against the loss of his earnings because of permanent and total disability or against the economic ravages of expensive illness in old age is as basic to his protection against want and destitution as is insurance against the loss of his earnings because of retirement in old age, which Mr. Peterson seems to accept as basic. Though fewer people actually lose their economic independence because of disability or because of expensive illness in old age, exposure to these hazards is universal, and protection against them is basic to everyone's economic independence.

It is true, as Mr. Peterson says, that the insurance industry is already regulated by Government and is not permitted to "misrepresent the nature of its promises." Some members of the industry and the people associated with it, however, are permitted to, and do, make misleading and inaccurate statements about social insurance in this country. Apparently some of them regard the old-age and survivors insurance program as a competitor—indeed, as an unfair competitor, for some reason—and feel that any statements they can make that will undermine the confidence of the American people in their basic retirement, life and disability insurance protection under the program and to forestall needed improvements in the program, are legitimate. Private insurance, operating in the public interest, should not try to undermine the people's confidence in their social insurance program.

Actually there is no question that the attacks made by people in the insurance industry in the last few years against social security have been extremely misleading in their portrayal of the nature of social security rights, taxes and benefits, while, contrary to Mr. Peterson's statements, the issuances of the Social Security Administration have been scrupulously accurate. From the beginning, officials of the Social Security Administration have attempted to explain clearly and accurately the nature of the old-age and survivors insurance program. In order to do this they have in the past drawn analogies between social insurance and commercial insurance. The drawing of an analogy between two things based on points of similarity is not misrepresentation, even though the two things analogized may not be the same in all respects.

There is no advantage in attempting to

convince people that social insurance is the same in all respects as private insurance. In many respects social insurance has advantages over private insurance. The lack of existence of a contract, for example, in government social insurance is not a disadvantage but an advantage. In the words of the U.S. Supreme Court, "To engraft upon the Social Security system a concept of 'accrued property rights' would deprive it of the flexibility and boldness in adjusting to ever-changing conditions which it demands."

Mr. Peterson suggests that "Congress should provide for an independent check of all statements and publications of the single-voiced 'monopolistic' Social Security Administration." This suggestion betrays real ignorance on his part of how the Federal Government operates now. Congress has in fact established, in the General Accounting Office, an agency to carry out an independent review of the operations of all executive departments. There has been in existence in the headquarters building of the Bureau of Old-Age and Survivors Insurance in Baltimore, as well as in some of its field installations, a permanent staff of GAO auditors who have access to all Bureau records and who get the fullest cooperation from Bureau employees. This group is charged with the responsibility for examining the manner in which the Bureau is discharging its responsibilities under title II of the Social Security Act. As an independent agency with responsibility to report directly to the Congress, the General Accounting Office is completely free from influence by the Social Security Administration. GAO is not subject in any way to direction from any part of the Executive Branch in carrying out its review of old-age, survivors, and disability insurance operations and policies to determine that (a) they conform to the intent of Congress, and (b) they carry out the authorized activities in an effective and efficient manner. Results of the reviews are reported by the Comptroller General directly to the Congress.

In addition to this on-the-spot continuing surveillance of operations, there are other checks and balances. There are periodic checks through the budget process, for example; the Congress evaluates requests for appropriation prior to authorizing the expenditure of funds, and in this connection Appropriations Committees may look into any policy or procedure prescribed in the administration of the program, and frequently they have looked into matters that have come to their attention. In fact the checks and balances established to control Federal social security operations compare favorably with those to which private insurance firms are subject—and are probably more effective than most State insurance regulation of private insurance.

Mr. Peterson has suggested that I am guilty of arrogance in proposing a more adequate social security system. I don't agree, of course, for reasons that I will explain, and in fact I would suggest that there is some arrogance on his part when he says that private insurance is "the only field . . . where the word 'insurance,' standing alone, is properly used." Private commercial insurance has no more right to the exclusive use of the word "insurance" standing alone than does social insurance. Both are insurance, with more similarities than differences. For the private insurance industry to arrogate to itself the exclusive use of the word is, in my opinion, presumptuous and unwarranted.

I confess that I did not clearly understand Mr. Peterson's meaning in applying to social insurance planning the adjective "arrogant" until I read his explanation in his comments on my article. As I now understand his position, it is that social insurance planning is arrogant because social insurance programs do not gen-

erally operate on a full-reserve basis, and will need to continue to exist, and to collect taxes, in order to pay the benefits provided for in the law, while private insurance, since it has to operate on a full-reserve basis, is absolved of the charge of arrogance.[1]

Mr. Peterson here is of course not saying that social insurance should operate on a full-reserve basis. He knows, I am sure, that operation on that basis would create reserves that would be huge, unwieldy, and, in a national compulsory insurance system that can be expected to continue into the indefinite future, excessive. And surely, recognizing as he does the need for social insurance in our society (at least to provide "a basic layer of protection against want and destitution"), he would not have had it limited for many years after its inception to paying the meager benefit amounts that could be financed completely from the contributions made by workers who were past middle age when they were covered by the program, and by their employers with respect to their earnings.

Basically what he is saying, I believe, is that since full-reserve financing is not practicable or desirable for social insurance, the program should be kept, in the present, as meager, inadequate and unsatisfactory as the people will put up with in order that our people in the future will not be asked to pay any more in taxes than necessary to support a very meager program now. The "arrogant assumption" that Mr. Peterson is talking about is the assumption that people in the future will be willing to pay a somewhat higher contribution to social insurance in order to meet the cost of making adequate provision for present beneficiaries than they would if those beneficiaries were not provided for adequately.

I do not consider this an arrogant assumption. I believe that additions to the cost of the program resulting from such essential and equitable measures as providing full benefits for people who were already old when the program started and providing benefit increases for people already retired at the same time as they are provided for future beneficiaries will not be resented by the American people of the future. Actually the additional cost resulting from paying full benefits to people whose full working lives have not been spent under the program is not large. The level-premium cost of the protection provided under the present program for people covered by the program for a full working lifetime is estimated at 5.3 per cent of payroll, as compared with the ultimate employee contribution rate of 4½ per cent, so that the cost of providing full protection for people who do not spend a full working lifetime under the

[1] Though the social security program does not operate on a full-reserve basis, it is a mistake to think of it as a pure "pay-as-you-go" system. The Federal Old-Age and Survivors Insurance Trust Fund and the Federal Disability Insurance Trust Fund play an important role in the financing of the program. The combined assets of these two funds exceeded $22 billion at the end of last year and it is estimated that, based upon present provisions and assumptions, this figure will more than double over the coming decade. In addition to serving as contingency reserves for use in temporary situations when current income is less than current outgo, the trust funds, because they are invested in interest-bearing obligations of the United States Government, earn interest income to help pay for benefits and administrative costs. This interest income over the long run will make possible lower contribution rates than would otherwise be needed. Recently the role of the social security trust funds was examined by the Advisory Council on Social Security Financing, a group of outstanding representatives of employees, employers, the self-employed, and the general public, which included two distinguished actuaries, Reinhard A. Hohaus and my colleague, Professor Carl H. Fischer. The Council stated in its report:

> The Council approves of the accumulation of funds that are more than sufficient to meet all foreseeable short-range contingencies, and that will therefore earn interest in somewhat larger amounts than would be earned if the funds served only a contingency purpose. The Council concludes, however, that a "full" reserve is unnecessary and does not believe that interest earnings should be expected to meet a major part of the long-range benefit costs.

program, over and above what they pay themselves, may be thought of as being met out of the employer contribution to the program.

More important than the benefit-contribution relationship under existing law is the question of what protection a younger person is really paying for when he pays social security contributions. I have no question that, in the light of the history of benefit changes over the last 10 years, it can be said that the social insurance taxes the younger worker pays go to provide protection, not in terms of today's wages and prices, but in terms of those that will be prevailing during the period of his retirement, commencing 30 or 40 years hence. The statement could be backed up by the fact that if wages go up, as of course there is every reason to expect they will, the program is overfinanced at the tax rates now scheduled, and benefits can be liberalized without contribution-rate increases. Thus the protection purchased at any given time cannot be measured in terms of the benefits provided for in the law at the time the contribution is paid.

Mr. Peterson points out that if an amendment providing for contracting out of social security were adopted, and if new entrants to the labor force generally did contract out, the financial basis of the program would be weakened. This is quite obviously the case. It is, of course, the reason why contracting out in the social insurance program is not desirable or appropriate. In the same way, if private Insurance Company "A" had a group annuity plan and a rival insurance company offered to take over from the plan the new entrants, the latter could quote a much lower cost than the average cost of the existing plan. If this contracting out were done, the cost for the group kept under the plan of Insurance Company "A" would soar drastically when expressed as a percentage of the payroll remaining. This would not reflect upon the operations of Insurance Company "A". It would be the expected result of the contracting out of the low-cost group.

Mr. Peterson implies that the fact that the program is supported out of earmarked taxes, rather than out of general taxation, has led to financial irresponsibility in developing the program. This is not supported by any experience. I am convinced that, on the contrary, the fact that the program is supported from earmarked taxes has encouraged financial responsibility toward the program. No liberalization has ever been adopted by the Congress without provision for meeting its cost through the payroll tax, and the public, because it knows that the cost of its insurance protection must be met, has accepted the increases in the tax rates that have been provided for. The Congress and the Executive Branch, under both political parties, have taken pains to insure the future soundness of the program, and its soundness has been tested and affirmed time and time again by governmental and nongovernmental groups. I am sure that as much care will be taken by both the Executive Branch and the Congress to insure the future soundness of the program as it is extended to cover new risks. There is just as much a sense of responsibility among the executives and actuaries of the social insurance program as there is among the executives and actuaries of private insurance.

WILBUR J. COHEN, *Professor (on leave), The University of Michigan, Washington, D.C.*

Monetary Values for the C.S.A. Table

When this reviewer came upon Professor Chastain's article in the December 1960 issue of the *Journal of Insurance*[1] his initial reaction was one of sheer delight. At last, it appeared, someone was going to develop a simple device to teach insurance students a realistic method for life insurance calculations, using a simple model of mortality and interest. This delight lasted almost three pages. Step A, "Mortality Only," was excellent; Step B, "Mortality and Interest," was fine as far as it went. In vain this reviewer looked for the step headed "Commutation Columns —A Short Cut to Calculations." Of course, the reviewer's expectations may have been too high—after all, the title referred to the A, B, C's, not the D's, N's, C's and M's.

This seemed particularly unfortunate since the author used values of M_x and N_x for $x = 1$ on page 93 ($23,720 and $174.12 respectively; actually these are 1,000 times the commutation figures to reflect the amount of insurance). Moreover, on page 94 appears an interesting chart which contains on the left side of the page complete values of D_x and 1,000 C_x. From these, a simple summation would produce N_x and M_x values for years other than 1 and 10; indeed, if Professor Chastain's calculator resembles this reviewer's, he must have had these and let them escape.[2] From these figures, all types of premium and reserve figures readily may be obtained. It is a pity that the author did not recognize this. Rather, he made the statement that "Since Figure 2 is drawn for an ordinary life policy at age (1), it cannot be used for other types of policies or for policies issued in other years." As a matter of fact, the rates for any type of policy, any age of issue and any duration can be computed readily by summing the appropriate figures from the column on the left of the figure.

This reviewer suggested to Professor Chastain and to the editor that it might be appropriate for the author or someone else to extend the development of the article to demonstrate the simplicity of the commutation column figures and their usefulness in computation. Somehow, as the correspondence progressed, he got stuck with the job himself.[3] The balance of this communication will attempt just that and further snide comments on Professor Chastain's excellent beginning will be foregone, with one minor exception.

Because the original article developed the CSA mortality table starting at age (or year) 1 instead of year 0, a slight adjustment must be made in the conventional notation. This could be accomplished by either renumbering the years of the mortality table, changing the formulae for all premiums or reserves, or shifting by one year the age index in the definitions of C_x and D_x. The last of these seemed simplest and was used. The following table gives the CSA mortality table, the discount factors and monetary values (commutation columns).

The development of this table is quite simple, and well might be assigned to students as an exercise. The basic theory was developed over a century ago and first systematized formally by King, it is believed.[4]

[1] Chastain, James J., *"The A, B, C's of Life Insurance Rate and Reserve Computation,"* Volume XXVII, No. 4, p. 91.

[2] Unless he added from 1 towards 10 instead of the reverse.

[3] It is possible that there is a moral here somewhere.

[4] For further reference, it is not necessary to go back to King or even to Spurgeon. A few of the more modern works which this reviewer can cite fully without leaving his office include: Bohm, Friedrich, *Versicherungsmathematik*, Berlin, Walter Gruyter & Co., 1953; Dickerson, O. D., Mariani, V. R. & Wickman, J. A., *Life Insurance Premiums and Reserves*, (Unpublished

TABLE 1

CHASTAIN'S STRICTLY ABSURD MORTALITY TABLE

COMMUTATION COLUMNS 4%

(1) *Age* x	(2) *Discount Factor* v^x	(3) *Number Living Beginning of Year* l_x	(4) *Number Dying in Year* d_x	(5) *Death Rate* $q_x = d_x/l_x$	(6) *Number Living Discounted* $D_x = v^{x-1}l_x$	(7) *Sum of Discounted Number Living* $N_x = \sum_{t=0}^{\omega-x} D_{x+t}$	(8) *Discounted Number Dying* $C_x = v^x d^x$	(9) *Sum of Discounted Number Dying* $M_x = \sum_{t=0}^{\omega-x} C_{x+t}$
0	1.0							
1	0.96	30	1	0.033	30.	174.12	0.96	23.27
2	.92	29	1	0.034	27.84	144.12	0.92	22.31
3	.89	28	2	0.071	25.76	116.28	1.78	21.39
4	.85	26	2	0.077	23.14	90.52	1.70	19.61
5	.82	24	3	0.085	20.40	67.38	2.46	17.91
6	.79	21	4	0.190	17.22	46.98	3.16	15.45
7	.76	17	5	0.294	13.43	29.76	3.80	12.29
8	.73	12	5	0.417	9.12	16.33	3.65	8.49
9	.70	7	4	0.572	5.11	7.21	2.80	4.84
10	.68	3	3	1.000	2.10	2.10	2.04	2.04

Column (1) is the age (or year if one prefers); it requires no further comment. Column (2) is the rounded 4 per cent discount factor given by Professor Chastain on page 93 of his article. Columns (3) and (4) are the number living at the beginning of the year and the number dying during the year according to the CSA Table which appears as Table 1 on page 92 of the article. Since Column (4) is just the first differences of Column (3), only Columns (2) and (3) are independent. All the others can be developed from these two (taking the index column of age for granted, of course).

Column (2) is headed v^x. v is defined as $\frac{1}{1+i}$ where i is the interest rate. In this example, $i = 0.04$; $v =$ app. 0.96. Column (3) is headed l_x to designate the number living at age x and Column (4) is headed d_x to designate the number dying during year x. The subscript x always designates the age involved.

Column (5) gives the death rate or the probability of a person living at the beginning of the year dying during the year. It is of course age specific and is designated q_x. It is, of course, equal to $\frac{d_x}{l_x}$. It serves no purpose in the further development but is reproduced to demonstrate that Professor Chastain's table is in accordance with observed experience in that the death rate is monotonically increasing with age.[5]

Column (6), D_x, represents the number living discounted to age 1. If the reader is worried about the propriety of discounting people for interest, he may think of the D_x values as the present values as of age 1 of one dollar payable to each survivor of the original group who reaches age x. The D_x values are derived by multiplying the l_x values by v^{x-1}. (The usual formula, $D_x = l_x v^x$ is modified for the reason pointed out above.) Thus $D_x = l_x v^{x-1}$. Column (7),

mss., The American College of Life Underwriters, Bryn Mawr, Pa.); Jordan, Chester W., *Life Contingencies*, Chicago, The Society of Actuaries, 1952; Knight, Charles K., *Advanced Life Insurance*, New York, John Wiley & Sons., Inc., 1926. Larson, R. E., & Gaumnitz, E. A., *Life Insurance Mathematics*, New York, John Wiley & Sons Inc., 1951; and Menge, W. O. & Glover, J. W., *An Introduction to the Mathematics of Insurance*, New York, The MacMillan Co., 1935.

[5] The death rate decreases for the first ten years or so in tables based on actual experience, but increases thereafter at an increasing rate.

N_x, is merely the sum of the D_x values from the bottom of the table upward. Thus $N_x = \sum_{t=0}^{\omega-x} D_{x+t}$. These figures represent the sum of the discounted 1_x values. Equivalently, they may be thought of as the present value, at age 1 of a one dollar whole life annuity due starting at age x for all the survivors of the original group.

Columns (8) and (9) bear the same relation to the d_x values as Columns (6) and (7) do to the 1_x values. Column (8) represents the discounted number dying, or the present value at age 0 of one year term insurance for each survivor of the original group for the year of age x. $C_x = d_x v^x$. (The usual formula is $C_x = d_x v^{x-1}$.) M_x represents the sum of the D_x values from the highest age down. $M_x = \sum_{t=0}^{\omega-x} C_{x+t}$. At this point the sophisticated reader will be saying "of course" and the less sophisticated "so what"? The former is advised that he should have stopped reading the article when he got to the table and the latter that the commutation column values make possible tremendous economies in computation of which it is little short of criminal to deprive the poor student.[6]

Briefly, M_x represents the present value of future benefits from age x on (valued as of age 1) and N_x represents the present value of future premiums (valued as of age 1), in each case for the remainder of the life span. Dividing the former by the latter produces the ordinary life premium at age x since the discount factor neatly cancels out. For shorter periods of coverage, one merely subtracts M_x for the first age at which there is to be no coverage or equivalently adds the appropriate D_x values. For shorter premium paying periods, one subtracts N_x for the first age at which premiums are not payable or adds the equivalent D_x values. For an endowment policy, one adds to the numerator the D_x value for the age at which the endowment benefit is payable.

For example, the following are the computations for the examples given by Professor Chastain:

a. Ordinary Life at age 1 (Net Annual Level Premium)

$$P_1 = \frac{M_1}{N_1} = \frac{23.27}{174.12} = 0.13364 \text{ (x 1,000 = 133.64)}$$

(The multiplication by $1,000 adjusts for the amount of insurance. Professor Chastain's premium of $134.00 was rounded.)

b. Five Pay Life at Age 1 (N.A.L.P.)

$${}_5P_1 = \frac{M_1}{N_1 - N_6} = \frac{23.27}{174.12 - 46.98} = \frac{23.27}{127.14} = 0.18303$$

(x 1,000 = 183.03)

c. Five Year Endowment at Age 1 (N.A.L.P.)

$$P_{\overline{1:5}|} = \frac{M_1 - M_6 + D_6}{N_1 - N_6} = \frac{23.27 - 15.45 + 17.22}{174.12 - 46.98} =$$

$$\frac{25.04}{127.14} = 0.19695 \text{ (x 1,000} - 196.95)$$

The following give the same premiums at age 5:

a. $P_5 = \frac{M_5}{N_5} = \frac{17.91}{67.38} = .26581$ (x 1,000 = 265.81)

b. ${}_5P_5 = \frac{M_5}{N_5 - N_{10}} = \frac{17.91}{67.38 - 2.10} = \frac{17.91}{65.28}$

$= 0.27436$ (x 1,000 = 274.36)

c. $P_{\overline{5:5}|} = M_5 - M_{10} + D_{10} = \frac{17.91 - 2.04 + 2.10}{67.38 - 2.10}$

$= \frac{17.97}{65.28} = 0.27528$

(x 1,000 = 275.28)

The following gives a few others:

a. Immediate Life Annuity Age 1

$$a_1 = \frac{N_{x+1}}{D_x} = \frac{N_2}{D_1} = \frac{144.12}{30} =$$

4.804 (per $1.00 annual annuity)

[6] The adjective indicates sympathy, not a value judgment of ability. Good students should not be deprived of this knowledge either, since they have even less need for arithmetic practice.

b. Five Year Deferred Life Annuity Age 1
(No refund for death during deferred period)

$$ {}_5|\ddot{a}_1 = \frac{N_{x+n}}{D_x} = \frac{N_6}{D_1} = \frac{46.98}{30} = $$

$1.566 (per $1.00 annual annuity)

c. One year term, age 7

$$ c_7 = A^{1}_{7:\overline{1}|} = \frac{C_7}{D_7} = \frac{3.80}{13.43} = 0.28295 \ (\times 1{,}000 = 282.95) $$

Finally, a brief reserve computation is presented:

8th year terminal reserve, ordinary life issued at age 1

$$ {}_8V_1 = A_9 - P_1\ddot{a}_9 $$

$$ = \frac{M_9}{D_9} - 133.64 \times \frac{N_9}{D_9} $$

$$ = \frac{4.84}{5.11} - 133.64\,\frac{7.21}{5.11} $$

$$ = 0.94716 - (133.6 \times 1.411) $$

$$ = 0.94716 - 0.18851 = 0.75865 \text{ or } \$758.65 \text{ per } 1{,}000, $$

This is more precise than Professor Chastain's figure which shows the effect of successive rounding in a recursion formula.

Once the principles of commutation values have been learned with the CSA table, it should be easy for students to apply them to the CSO or any other table. Monetary values are available in a variety of published sources. It is hoped that this brief explanation and the values here presented will serve to make the teaching of life insurance mathematics more effective and encourage more teachers to present the whole picture instead of the truncated viewpoint new commonly presented.

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Author's Reply

Uses of the simplified mortality table to which Professor Dickerson refers were intended to be illustrative rather than exhaustive. The purpose of the article was to demonstrate the use of an intermediate step in rate and reserve computation to precede the use of cumbersome mortality and present value tables in life insurance rate and reserve computation. The existence of the step is more important than its form.

Just as it is not essential to the understanding of the concept of life insurance rate and reserve computation to use current mortality tables and present value tables accurate to five or more decimal places, neither is it essential to understand the short cut to calculations provided by a commutation column, nor is the use of mathematical symbolism essential. Students engaged in an extensive (perhaps lifetime) study of rate and reserve computations should find Professor Dickerson's contribution valuable. For other "poor" students the commutation column may be desirable but not essential. It may even prove to be a detour rather than a short cut. Whether or not the teacher finds the commutation column useful will probably depend on whether his goal is to teach rate and reserve computation theory or practice.

A simplified mortality table has many possible pedagogic uses. It may be used to illustrate the effects of changing interest rates and changing rates of mortality on company finances. The effects of "buy term and invest the difference" may be vividly illustrated by having students compute the price of term and permanent policies at the same age and then having them compare the alternative

choices of the purchase of permanent insurance or the purchase of term insurance plus investment of the difference. The interested teacher can find many other uses for the simplified model. Even Jacques Saint Laurence leaves certain uses of his new models to the imagination.

The author feels great satisfaction in having delighted Professor Dickerson for as long as three pages.

JAMES J. CHASTAIN, *Director of Field Services, The American Institute for Property and Liability Underwriters, Bryn Mawr, Pennsylvania*

TRAINING PROBLEMS INVOLVED IN THE HANDLING OF FOREIGN CLAIMS

The need for constant training of insurance personnel, whether it be initial guidance and indoctrination, or subsequent refresher programs, is today so well recognized that we now simply start with the question "How is such training most efficiently accomplished?"

The training of any group of people will always involve peculiar problems applicable only to that particular group. This is so whether we are dealing with a large multiple line insurance company, a medium or small size domestic specialty company or an American company dealing with risks abroad, my present field of interest.

At best, training of claim department personnel presents special problems because of the impracticability of bringing men from the field to a central classroom for any length of time, the diversity of the many new policies which are being issued almost daily, and because of the lack of uniformity in the applicable law and the decision involved in their interpretation.

In order to be most effective, a training program should be a formal one in the sense that it should be well planned and executed. Proper and thorough training encompasses all aspects of claims handling. The ideal program should in my opinion encompass the following areas:

(1) Classroom lectures and discussions.

(2) Reading and studying text books and articles on claims handling, law and general insurance; familiarization with company manuals, reading and studying policy forms and applicable cases.

(3) Job training under competent supervision. This means actual claims handling on a selective basis, supervised by a competent senior.

(4) Familiarization with clerical routines and procedures.

(5) Company orientation and intercompany relationships.

In a claim operation which encompasses worldwide scope, it is immediately obvious that any adequate number of classroom lectures and discussion must be ruled out for economic reasons if for no other. The alternative therefore, is to attempt long distance training by means of correspondence, directed reading, and supervision by mail.

In dealing with claims handling in this country, there may not be as many texts as we would like to see, but there is some good available material. My own book on casualty claims handling resulted from a need for such a text at a time when I was in charge of the casualty claims operation for a domestic company. There are also any number of articles which help to interpret the various policies that have been written, and the principal policies themselves are to a great extent standard or at least similar in nature and wording. In addition, the provisions of these policies have been interpreted many times by the State Courts and these interpretations are a matter of record and available at the nearest law library. In this country, there are claim files to be read in a common language understandable to all.

Now imagine trying to institute any kind of formal training program where there are no available text books and where the diversity of claims practices,

laws and policies is so extreme as to make such a text or even company manual, completely impracticable, where articles and other written material are almost nonexistent, where policies are more often tailored to meet the needs of a particular country or locality with much less uniformity than we have in this country, and where case law is in many instances not only unavailable, but where there is no English translation of the existing code law itself.

Personnel men and claims executives know how hard it is to find adequate help in the fields where technical training is essential. Add to this the qualification of a knowledge of foreign languages and you have practically closed the door on possible applicants. There are the alternatives therefore, of trying to train language students to be claims people, having claims people learn new languages, or make arrangement for translations that will enable the claim department to obtain understandable reports.

In the American International Underwriters Corporation we are fortunate in that we have an adequate translation department and are staffed in many parts of the world with bilingual people who are familiar with the English language as well as their own. Training these people, however, is still nevertheless a major problem because classical knowledge of a language is not adequate for ordinary commercial purposes. First of all, even where the language is allegedly the same, as for instance England, insurance terms are often different. In this country, we refer to "First Party Claims" which in England are called "Own Damage." Our use of the word "Collision" is at variance with theirs. We talk about an "Attorney." They distinguish between "Solicitor and Barrister." When one gets into the realm of different languages, the difficulties of terminology are that much more complicated. In addition, the every day use of a language involves many colloquialisms which are used by all as a matter of course. It is extremely difficult to try to eliminate these completely when one dictates a letter to a foreign country, but this must be done if misinterpretation is not to be invited.

In conducting a correspondence course in this country, one can usually determine almost to the day when the material will be received in the field and how long it will take for the reply to reach him. In most of the more advanced parts of Europe, the mail service is even better than ours, but Europe and the United States are only a small part of the world. In many parts of the world, mail delivery is slow and uncertain and this too adds to the burdens of a training program.

Local custom and usage play a big part in any business activity and claims handling in the insurance field is no exception. More often than not, when specific instructions are given from the Home Office concerning the obtaining of signed statements, police reports, physical examinations or other vital elements of a claims investigation, the reply is "We do not do that here," or "We cannot get that here." Half of the time, it becomes very obvious that this is merely an excuse for not obtaining necessary information, but at least part of the time, the reply is an honest one. You are then confronted with the problem of requesting the foreign office to do things your way and "stick their necks out," or of accepting the situation and doing without. This situation becomes particularly acute in some countries whose people feel that their traditions and methods are at least as old as ours and where resistance to change is almost a way of life.

In a claims training program, the teachers are the Home-Office claims examiners. They must learn the peculiarities of the territories that they are examining. This is what makes a training program in a worldwide organization so extremely difficult.

One just cannot go out and hire people who are familiar with claims handling as well as the pertinent law of a dozen or more countries. There just are no such people. So, before one starts on his field training program, he must first train his Home-Office examiners. It takes quite a while before a person steeped in American legal procedures realizes that there is no such thing as a jury system for civil actions anywhere in the world except in the United States. It takes quite a while for him to get accustomed to the idea that in most Latin American countries and in many of the European countries, a criminal hearing on traffic violations and offenses goes hand-in-hand with possible civil responsibility and that the judge who tries the criminal action can at the same time, and usually does, make a civil assessment of damages. It takes additional time to learn that while the statute of limitations may vary from a short period of time to infinity, in many countries the statute becomes meaningless because it is tolled as soon as any settlement discussions or negotiations take place between the insurance company representative and the claimant or the claimant's representative. Most difficult for a U.S. examiner to understand is the fact that in many European countries there can be no final settlement until the Social Security Board or its equivalent, makes a determination, since these agencies have subrogation rights against the insurance company which neither the carrier nor the claimant can extinguish. Accordingly, partial settlements are the rule of thumb in many European countries, whereas this would be unthinkable to a Claim Department operating in the United States.

Then, there is the area of training in clerical routines and procedures. Lack of training or improper training in this field can cause untold headaches for the Home-Office as well as the field. It is difficult to keep the margin of error down, even in a local operation where direct supervision and training is constant. Add the burdens of distance, different languages, different customs and the result is a compounding of errors that calls for an efficient and constant training course by correspondence and infinite patience on the part of the Home-Office staff that is doing the training.

The temptation is often great to correct errors at the Home-Office when they have been committed in the field. While this may be momentarily expedient, it does not help to train a field representative. Accordingly, although slow and exasperating, the work should be sent back to the field for correction.

Finally, there is the problem involved in monetary exchange where you are dealing with half a hundred or more currencies. Reserves, claim payments and expense items must all be correctly converted into dollars from the local currencies which often fluctuate considerably. Claim personnel must be taught that even where all other factors remain static (and any claims man can tell you how rarely this happens) the reserve must be constantly reviewed because of the currency differential.

This is one side of the coin. To be sure, problems are plentiful but so are the satisfactions when the training efforts result in even some measure of the desired effects. Our people are diplomats every minute of the working day and are extremely conscious of their responsibilities as representative Americans as well as representatives of American International Underwriters Corporation. We are only too well aware of the fact that what our foreign co-workers think of us, greatly colors their opinion of our country.

PATRICK MAGARICK, *Secretary and General Claims Manager, American International Underwriters Corporation.*

PUBLICATIONS AND RESEARCH

Book Reviews

INSURANCE PUBLIC POLICY. By Spencer L. Kimball. The University of Wisconsin Press, Madison, Wisconsin, 1960. xii plus 387 pages.

Reviewer: C. Arthur Williams, Jr., Visiting Professor of Insurance, University of Pennsylvania.

The relationships between insurance and public policy have been treated by many authors but the approach employed by Professor Kimball in this book is unique, comprehensive, entertaining, and informative. Professor of Law at the University of Michigan, the author of several articles on insurance law, and the recipient of a one-year grant from the Rockefeller Foundation, Professor Kimball has studied the legal implementation of social and economic public policy toward insurance in Wisconsin from 1835-1959. Wisconsin was selected as his laboratory (1) because it is more typical than Massachusetts or New York which are better known for their regulatory activities and (2) because of the availability of detailed information whose volume would certainly have discouraged most other researchers or at least caused them to narrow the scope of their inquiry. Wisconsin also has a superior record of progressive legislation and insurance regulation and, therefore, the author is probably overstating the case somewhat when he asserts that the story of Wisconsin developments "would be the story of insurance law for the largest part of America." (p.v.) Be that as it may, the Wisconsin story is a fascinating one and Professor Kimball tells it well.

This study is not a dull recital of legal history. Instead the legal developments (statutes, bills which were proposed but not enacted, at least when they were first introduced, court cases, and Attorney Generals' opinions) are viewed against a background of economic, political, and social changes. The insurance business is pictured as an evolving institution which both affected and responded to these developments. In addition, instead of adopting a purely chronological approach, Professor Kimball has organized his material first along functional lines, which makes the analysis far more meaningful and useful. Although he acknowledges a substantial debt to Professor Edwin W. Patterson in this regard, his structure is largely original.

Following an introductory chapter which emphasizes the current importance of insurance (he calls the mid-twentieth century the "age of insurance") and outlines the author's basic approach, Chapter 2 is concerned with the validation or legality of the insurance enterprise itself. The author traces the passive approval of the law to the extension of the private insurance enterprise to new fields and its more active role in social insurance.

Chapter 3 deals with the creation of an adequate insurance fund to pay losses of the type falling within the valid area of operation. This discussion deals with the various types of private and public insurers; the legitimacy of the corporate

structure in insurance, the proper scope of corporate operations, and the control of corporate insurers; the provision and the role of a capital fund; rate making and premium collection; and the marketing of insurance.

In Chapter 4 the author analyzes the ways in which society has sought to protect the integrity of the insurance fund against dissipation. This analysis is concerned with such matters as limitations on investments, underwriting restrictions, reserve requirements, suppression of the tontine, control of agents' commissions, insurer reports, and examinations. Although the reason for its inclusion in this chapter is not entirely clear, the analysis also includes a discussion of the development of an independent insurance department and evaluates the performance of the various commissioners. The dependence of the quality of administration upon the personal characteristics of the commissioner is a major theme of the discussion.

Chapter 5 covers the administration of claims and the distribution of the fund. For the first time, the courts, not the administrators and legislators, emerge in certain areas as the principal makers of public policy. The chapter includes such topics as the control of loss settlement procedures, the relationship of marketing practices to claims administration, the statutory control of policy terms, and the valued policy law.

Chapter 6, which is entitled "Insurance in the Larger Society," describes the taxation of insurers, deposit requirements, regulation of unauthorized insurers and non-resident agents, and the role of insurers in the prevention and mitigation of loss.

The author's conclusions are presented in Chapter 7. The three quotations which follow illustrate the nature and tone of the conclusions, some of which should attract widespread attention:

> Whereas in the nineteenth century insurance ministered primarily to the needs of economic men, in the twentieth it became one of the main instruments by which law created a welfare-minded society. Most human activity in the mid-twentieth century had insurance implications. (p. 301)

> Despite the complexity of the insurance business, and its technicality, the law that nurtured it mirrored attitudes, hopes, and fears that pervaded society far outside the insurance office. (p. 301)

> From a surprisingly early date insurance was regarded, even by insurance men, as a business affected with a public interest. Eventually, there were indications that the law might treat insurance as a full-fledged public utility, even in the sense that an insurer must supply its product to all who demanded it. . . . These developments, taken together with the regulatory regime under which the industry operated in mid-twentieth century, gave an indication of how little difference remained between insurance and the classic public utilities. (pp. 304-305)

The contents are far more lively than the structure outlined above would suggest. For example, several colorful personalities are included in the story. A few examples are Commissioner Fricke who was very critical of the taxation laws but enforced them vigorously; Commissioner Spooner, William Welch, and Senator William F. Vilas who were involved in the charges and countercharges associated with a raid on the surplus of the Madison Mutual Insurance Company; and Governor La Follette who, according to Professor Kimball, "joined the fight for adequate regulation of fire insurance rates only when its dramatic possibilities became sufficiently clear" (p. 100). Social, economic, and political forces such as Jacksonian Democracy, the Granger, Populist, and Progressive movements, the transition from a capital-scarce, near-subsistence economy to a market economy, and the increasing public emphasis on security are considered in the analysis and add to its flavor. The

histories of the direct action statute, the coinsurance clause, and the state fire insurance fund are examples of sub-topics which are not specified in the above outline but which make interesting reading. Finally, some of the proposals which were never enacted but which are mentioned in the study are certain to surprise most readers. For example, as recently as 1951 and 1953, bills were introduced which would make the insurer liable for all judgments beyond the policy limits if the insurer refused to settle within those limits. Another would have required all adjusters to be lawyers.

Despite this reviewer's obvious enthusiasm for this book, a word of caution may be in order. Professor Kimball acknowledges the large extent to which Wisconsin borrowed from New York in the early period and on p. 65 he states that Wisconsin continued to borrow freely from other states in the twentieth century. Despite this statement, however, less-informed readers may attribute more originality and responsiveness to Wisconsin than is deserved because the study only occasionally refers to developments in other states. The same lack of information will prevent more informed readers from determining easily in which areas Wisconsin was one of the leaders. On the other hand, to include such information would complicate the presentation immeasurably, make it much less readable, and have deferred its completion to a much later date. Wisconsin *is* explicitly credited with a few original contributions such as the gain and loss exhibit and the valued policy law.

One important development which is ignored (probably because it is too recent) in the conclusions and the discussion on rate making is the changing status of rating bureaus and the possible changes in rate regulation as a result of the recent insurance hearings by the O'Mahoney Subcommittee of the U.S. Senate Committee on the Judiciary. In this connection, however, the author's statement on p. 107 is particularly interesting.

> In mid-twentieth century Wisconsin, fire insurance rate regulation was in process of becoming effective; the attitudes of the public and hence of men in public life were generally favorable to it. . . Every sign pointed to more effective regulation of rates as the years passed.

The last chapter of this study can serve as a summary for the busy reader who can only afford to sample the book, but the study deserves a slow and careful reading. One cannot help but improve his understanding of insurance and insurance regulation by reading this volume.

This book deserves a place in the library of every insurance scholar and could serve as a reference work in any insurance course dealing with public policy or any public policy course dealing with insurance. Its value will be enhanced if similar studies are prepared in other states.

INTERNATIONAL INSURANCE. By Hardy F. Glass. International Insurance Monitor, New York, 1960. 132 pages.

Reviewer: Mark R. Greene, Associate Professor of Insurance, University of Oregon.

The casual observer, seeking to broaden his knowledge about international insurance methods, problems, and trends, will probably be disappointed in this little volume. Written as a tribute to Professor Alfred Manes, a German insurance scholar, it is a collection of miscellaneous essays which touch on several aspects of international insurance but which do not make any significant penetration of them in depth. There are four contributors, including Mr. Glass. The material is extremely uneven in style, organization, and documentation. Some parts are completely undocumented and others only

partially so. There are many sweeping generalizations and unsupported conclusions. Much of the content is elementary and descriptive, making no serious attempt at analysis. For example, one of the main conclusions, namely, that there is a need for "an international insurance organism of purely technical nature" seems to be mainly only a plea which is logically appealing. While such an organization may in fact be needed, certainly the material in this volume does not appear to build a convincing case for it.

In spite of these faults there are some sections of the volume which the reader may find to be useful. There is a survey of the quantitative importance of insurance, both life and property, in certain European nations. This survey includes a description of the insurance system in the Soviet Union, and notes the ways in which Western practices have influenced this system. Additionally, there is a useful summary of the operations and purposes of governmental and private international organizations whose activities affect international insurance problems in some way. For example, the insurance activities of the General Agreement on Tariff and Trade (G.A.T.T.) and the Organization for European Economic Co-operation (O.E.E.C.) are discussed. The operations of the International Chamber of Commerce, International Credit Insurance Association, and the European Centre for Insurance Education and Training are among the ten non-governmental organizations described.

The author discusses what he considers to be the major international insurance problems. His central premise seems to be that many economic and insurance problems must be solved by some form of cooperation which crosses national boundaries. Among these problems are those of nuclear energy, transportation, inflation, and loss prevention. Only a cursory review is given however, and no convincing case is made for the conclusion that an international organization is required, or would have any reasonable chance of success in dealing with these problems.

WORLD INSURANCE TRENDS. Edited by Davis W. Gregg and Dan M. McGill. University of Pennsylvania Press, Philadelphia, 1959, xl plus 689 pages. $12.00.

Reviewer: Theodore Bakerman, Co-ordinator of University Research, Duquesne University.

This book consists of the complete Proceedings of the First International Insurance Conference held as part of the seventy-fifth anniversary of the Wharton School of Finance and Commerce of the University of Pennsylvania. The theme of the conference was "The Role of Private Enterprise in Insuring Life and Property Values." Participants included leading authorities from countries throughout the world.

The contents of *World Insurance Trends* are useful for many different purposes, and the book should be found in every library that aspires to scope and depth in the insurance field. The material contained in Part I, "The Insurance Environment in Major World Areas," and in Part IX, "Insurance Environment in Selected Countries," constitutes a convenient basic reference source for information on specific countries and areas that is otherwise extremely difficult to obtain. The political and social environment and growth potential for private insurance is outlined for each of twenty-seven countries. Here it is seen that the implicit claims contained in the title of the conference theme, are, indeed, too modest. Social insurance is given very adequate treatment. "Political environment" is interpreted in the narrow sense of government regulation, for the most part. The

addition of a consistent treatment of the present and potential role of various political forces would have provided another useful dimension.

Part III contains three papers dealing with the "Impact of Inflation on Insurance." Earl Hicks, Charles R. Whittlesey and Seymour F. Harris put the problems involved in broad perspective, providing a necessary analytical framework for the descriptive treatment of the stability of currencies in world areas and individual countries found in many papers in Parts I and IX. Whittlesey's paper may be singled out for some highly interesting differences in viewpoint. Illustrative in his statement that "The current fatalistic belief in chronic inflation is of a piece with . . . earlier fallacies."

As is the case with Part III, the subject matter of Part IV compliments that in Parts I and IX. Considering the "Regulation of Insurance," Adolf A. Berle, Jr. puts primary emphasis on capital formation, advocating the development of "steady and expert analysis of capital needs, preferably by a purely independent body," rather than government regulation. In the papers by Edmundo Merchan on Colombia and Horacio A. Mascarenhas on the Argentine, the effect of changing political environment is dealt with in a fashion that provides a flavor of the extra dimension that was mentioned as somewhat lacking in some other sections of the work. Those who are interested in comparisons of regulation of insurance should certainly extend their reading to the paper on Great Britain by Sir John Benn, contained in Part I. Since government control is pervasive in country after country throughout the world, the possibility of a contrary situation is not often entertained. It is well to be aware that:

> The principle of governmental regulation of insurance in Great Britain is epitomized by the phrase 'Freedom with Publicity' although by U.S. standards the amount of information required by our government is small. It is a basic belief that legislative control should be kept to an absolute minimum, and be directed to the safeguarding of the insuring and investing public; it is felt the business will develop more fully and soundly if left free of unnecessary restrictions.

Part V dealing with "Health Insurance," is worthwhile reading for all persons interested in the current controversy over national health insurance legislation. The seven papers in this section were written in an atmosphere relatively free from the heat so frequently found at present, and, although not directly concerned with the current situation, they are highly relevant. Countries covered in Part V include the United States, Great Britain, Germany and Canada. To these papers should be added that on "Insurance and the American Medical Profession" by Isidor S. Ravdin, one of the General Conference Addresses in Part II. The touchstone of the highest ethical precepts applied by this author merits emulation by his colleagues.

Reinsurance is examined in Part VII under the title of "The Capacity Problem." Although reinsurance of life insurance in the United States and Japan are dealt with primarily on a national basis in two papers, the three papers that make up the remainder of this section deal with reinsurance as, in the main, an international phenomenon. Critical of the continued existence of problems of capacity, Arne Fougner writes that "I am thinking above all of imagination, vision, courage, enterprise, and energy. If we have any capacity problem at all in the business of insurance and reinsurance, it is largely because those human qualities . . . have been so unequally distributed." From another viewpoint, C. Henry Austin, in his "Management's View of Insurance," appearing in Part VIII, also calls for the use

of imagination and initiative in providing coverage.

Parts VI and VIII, on marketing and consumer attitudes, are concentrated almost entirely on the situation in the United States. This concentration in these two sections is, perhaps, a prerogative of the host country.

To the reviewer, who frequently encounters difficulty in editing the writings of persons whose native tongue is English, the amount of work that the editors must have had to do to put *World Insurance Trends* in the excellent condition in which it appears is somewhat appalling. Their task was accomplished with great skill.

HEALTH INSURANCE. By Edwin J. Faulkner. McGraw-Hill Book Co., Inc., New York, 1960. xii plus 636 pages. $8.75

Reviewer: D. C. Wright, Assistant Professor of Insurance, Rider College, Trenton, New Jersey.

In 1940, the publication of Faulkner's *Accident and Health Insurance* burst like a beacon on high to light the way for both teacher and student in the sometimes tortuous climb along the pedagogic pathways of health insurance education. For several years this volume served and served well; however, even as the mountain must eventually surrender to the river, so did the steady erosion of new practices and new principles which were being swept along on the crest of the explosively expanding health insurance business, gradually wear away at the basic structure of that book. It was not until 1959, with O. D. Dickerson's excellent work, that we again saw a light gleaming brightly in the darkness, and now, with Mr. Faulkner's most recent book, our way is again well illumined.

It should be understood that this is not a revision of the earlier book, but rather is a completely new treatment of the subject, embodying the multiplicity of changes that have taken place within the past two decades. In fact, only a part of the chapter dealing with the early history of health insurance gives the reader any clue as to the common heritage of the two works.

This is a good treatment—clear, concise, readable and (also important), teachable! Without falling victim to the malaise of pedantics which seems to have afflicted so many authors to-day (text book authors seem particularly susceptible to this virus!), Mr. Faulkner has written a book which will be understood by the student, enjoyed by the teacher, and (dare one make the distinction?), appreciated by the scholar. In logical sequence the author deals with the need for health insurance and the several contracts which answer this need, then with the mechanics of that business which provides these contracts (with chapters on underwriting, premium rates, reserves, and claims), and finally, a section dealing with the regulation and history of the business, together with a brief glimpse into the future.

There are many features of the book which might be singled out for particular mention, however the natural limits of a book review must confine the comments of this reviewer to those few points which he feels are especially significant. First, in his consideration of the coverages and of the policy terms, the author does not attempt to make his analysis on a contract-by-contract basis. Rather, he devotes approximately eighty pages to a careful discussion of selected representative terms and conditions as they are found in most contracts, as well as giving special attention to several singular departures from the customary provisions. By so doing, Mr. Faulkner avoids much of the burdensome repetition which seems to be the special cross of insurance analysis to-day.

Another point which the reader will find most interesting is the treatment of premium rates and reserves. In his preface, Mr. Faulkner makes special mention of the work of his associate, Mr. John C. Angle, vice-president and actuary of the Woodmen Accident and Life Company, in the preparation of these chapters. The special mention is well warranted. The one area of insurance which most stubbornly resists the assaults of clarity and explanation is the bed-rock of the business: rates. Mr. Angle has done a very commendable job; replete with charts illustrating each point in his text, the explanation is lucid and follows in logical progression.

The final point is a particularly important one—especially so in the light of the recent interest of ARIA in the subject of terminology. This reviewer had the good fortune to study with Dr. Ralph Blanchard, and he still remembers most vividly the marginal imprecations of his teacher when the student strayed from the narrow path of precision into the broad and comfortable fields of ambiguity. Our chosen field of endeavor has been (to draw upon Justice Hand) a "Serbonian bog" of semantics—at times a gobbledygook of verbiage which would give pause to the authors of many of our governmental publications! Now, finally, we seem to be struggling slowly out of the morass—and high time! Mr. Faulkner deserves real praise for his careful, studied attention to definition and special commendation for the excellent glossary of some two hundred of the terms most commonly used (and misused) in the health insurance field.

In summary, this is an excellent and long-awaited book, written by a man with a vast wealth of experience in the field—a truly valuable addition to the literature of health insurance.

INSURANCE SURVEYS BUSINESS—PERSONAL. By R. G. Mielke. 4th Ed., The Rough Notes Co., Indianapolis, Indiana, 1959. 271 pages.

Reviewer: Paul D. Troy, Frank T. Slavin Co., Stamford, Conn.

The author expresses the scope and character of his book by stating in the foreword that

> This book is an attempt at introducing basic survey techniques and ideas to those who have not heretofore used the survey as a selling tool. . . . It is not intended to be an advanced text on insurance policies or recommendations which can come only with hard work and long practical experience.

Written in layman's language, the book is addressed to the agent and salesman of insurance. The sales potential of insurance surveys is emphasized throughout the book.

The author presents as the major topics of his book four fundamental steps in the preparation of an insurance survey, which he lists as follows: analyzing the exposures to loss, designing the insurance program, reviewing the present schedule of policies, and preparing and presenting the report to the insured.

The largest portion of the text is concerned with the reviewing and auditing of policies. Respective chapters have been devoted to the auditing of Fire, Business Interruption, Automobile, Liability, Marine, and Fidelity and Surety Bonds. These chapters are brief and present a superficial discussion of the auditing process for each of the important lines of insurance. In some instances the discussion is merely a description of the coverage provided by the various policy forms.

However, practical information of a general nature is provided to guide the agent in the preparation of policy audits. Suggestions are presented as to what the

agent should look for when auditing a policy, the significance of certain policy provisions is indicated, and methods are suggested for making proper policy recommendations. One chapter is devoted to the mechanics of how to secure lower fire insurance rates. Emphasis has been extended to business insurance surveys, although the need for personal policy surveys is stressed.

As can be expected in any text that presents a discussion of policy forms and provisions, the effects of time and a dynamic insurance industry make portions of the material out of date. The chapter on Business Interruption and the information on group life insurance would have to be revised in the light of recent changes.

The treatment of life and health insurance is very slight although the following quotation should encourage more investigation of the survey potential of this area of insurance.

> One large office reported that they had paid for $1,890,013.00 Life Insurance yielding a premium total of $181,684.00 during the previous year . . . and most of their Life Insurance sales resulted from making Insurance Surveys of their prospects property and indemnity insurance. (pp. 196-197)

This text should prove valuable to agents who have had little experience in making insurance surveys, and who would like to become more proficient in this area of their practice. Those experienced in survey work probably would agree that the book is a welcome primer in an area of insurance where there is a need for more technical work.

THE COMMISSION ON INSURANCE TERMINOLOGY

"Dictionaries do not make the language; language makes the dictionaries."

The Commission on Insurance Terminology was established in 1958 by the American Association of University Teachers of Insurance for the purpose of introducing, in an evolutionary way, greater clarity and exactness in insurance terminology. The specific objectives of the Commission are:

1. To engage in a continuing study of insurance language (words and phrases) for the purpose of evaluating the effectiveness of the language and recommending improvements where desirable.
2. To accumulate and publish a glossary of insurance words and phrases on which there is general agreement among practitioners and educators as to their meaning.
3. To develop a continuing program of information by which writers, editors, insurers, and others will have available more accurate and meaningful insurance terminology, and, through the art of gentle persuasion and assistance to those who make the insurance language, gradually bring some order out of the present chaos.
4. To cooperate with any other groups or individuals seeking to attain improvement in insurance terminology.

Committee on Social Insurance Terminology

C. ARTHUR WILLIAMS, JR., *Chairman*

The Committee on Social Insurance Terminology has been established by the Commission on Insurance Terminology. Dr. C. Arthur Williams, Jr., Professor of Economics and Insurance at the University of Minnesota, has been named as the chairman of this committee.

The initial membership includes management and labor representatives, government officials, insurance industry spokesmen, and academicians. The Committee membership is as follows:

C. Arthur Williams, Jr., Chairman, School of Business Administration, University of Minnesota

John F. Adams, Assistant Vice President, Temple University

Theodore Bakerman, Director, Bureau of Research, Duquesne University

Edison L. Bowers, Chairman, Department of Economics, The Ohio State University

J. Douglas Brown, Dean of the Faculty, Princeton University

Eveline M. Burns, The New York School of Social Work of Columbia University

James Christy, Manager-Insurance, The Upjohn Company

Wilbur J. Cohen, Assistant Secretary, Department of Health, Education and Welfare

Frank G. Dickinson, National Bureau of Economic Research

Joseph F. Follmann, Jr., Director of Information and Research, Health Insurance Association of America

Herbert C. Graebner, Dean, American College of Life Underwriters

Robert J. Myers, Chief Actuary, Social Security Administration

Ray M. Peterson, Vice President and Associate Actuary, The Equitable Life Assurance Society

Jerome Pollack, Program Consultant, Social Security Department—UAW

Oscar N. Serbein, Graduate School of Business, Stanford University

Herman Somers, Chairman, Department of Political Science, Haverford College

John G. Turnbull, School of Business Administration, University of Minnesota

William H. Wandel, Director of Research, Nationwide Insurance Companies

Ex Officio

William T. Beadles, Editor, *The Journal of Insurance*

Davis W. Gregg, Chairman, Commission on Insurance Terminology

Committee on Pension and Profit Sharing Terminology

DAN M. MCGILL, *Chairman*

JOSEPH J. MELONE, *Editor*

Three new members were appointed to the Committee:

Joseph Meier, Executive Vice President, Council of Profit Sharing Industries;

Bert Metzger, Director, Profit Sharing Research Foundation; and

Dr. Charles Tobin, Director, Marketing Research, Oscar Mayer Company.

The above members were all assigned to Subcommittee No. 6, Profit Sharing, J. J. Jehring, Chairman.

Two additional membership changes were made. Mr. B. Frank Patton, Chairman of Subcommittee No. 2, Method of Administration, Source of Contributions, resigned as a member of the Committee. The Chairmanship of Subcommittee No. 2 has been assumed by John B. St. John, Actuarial Consultant, Penllyn, Pennsylvania. Dr. C. Arthur Williams resigned as Editor of the Committee in order to assume his duties as Chairman of the Committee on Social Insurance Terminology. Dr. Joseph J. Melone, Assistant Professor of Insurance at the University of Pennsylvania, is now serving as Editor of the Committee.

Committee on General Insurance Terminology

RALPH H. BLANCHARD, *Chairman and Editor*

The criteria for terms to be considered by the committee have been adopted substantially as they appear in the report of the committee published in the June, 1961, *Journal*, with the exception of the criterion of "sales value", which was not adopted.

The committee has decided initially to consider the following 10 basic terms: risk, peril, hazard, insurance, insurer, insured, selfinsurance, contract, agent, broker.

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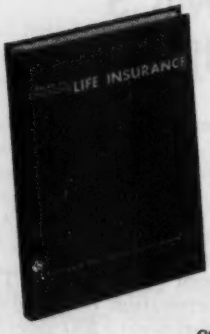

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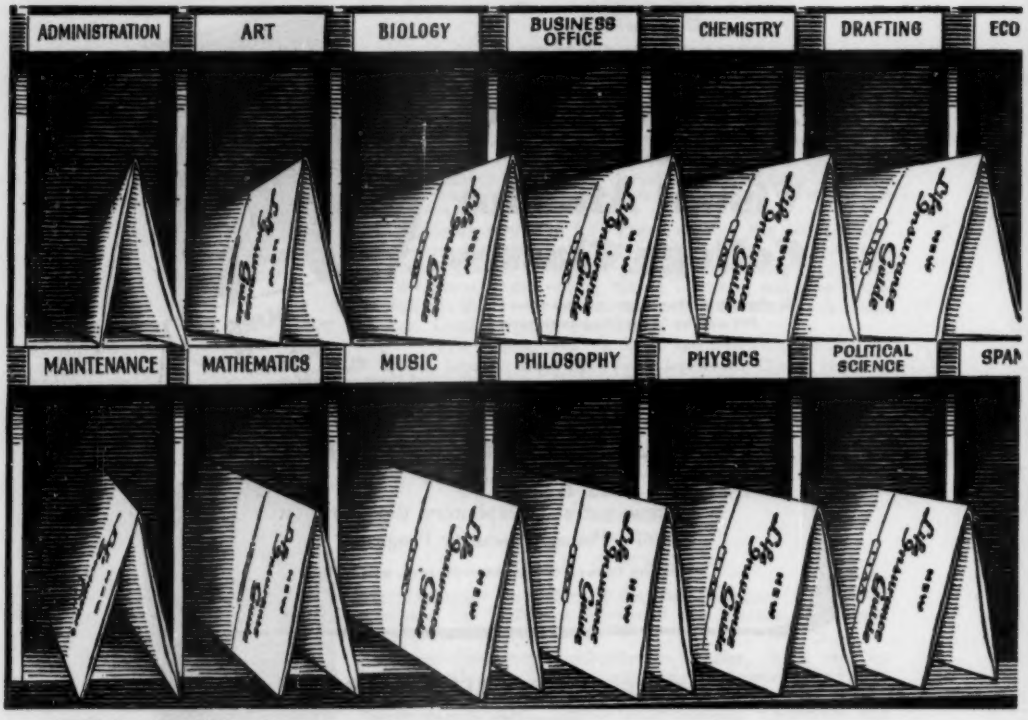

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